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Unisys projects loss, joining IBM, DEC profit slide. Page 4.

It's been two years and a day since the PS/2 came out to play. But it took time making friends. Page 12.

DEC readies Microvax powerhouses in bid aimed at the underbelly of the AS/400. Page 7.

Revived ethics, not rewritten laws, seen as key to battling computer crime. Page 100.

Adapso says it's on track after staff chief takes separate path. Page 77.

Slim Compaq system invigorates 80286 lineup. Page 37.

DBMS debate on object-oriented technology not likely to kill off relational systems. Page 23.

IBM pegs office as SAA proving ground

Multiplatform package due within 90 days

BY DOUGLAS BARNEY, WILLIAM BRANDEL and STANLEY GIBSON
CW STAFF

IBM will take its most aggressive stab yet at providing true cooperative processing when it unveils a suite of SAA-compliant office automation applications this spring.

In the process, IBM will boost the importance of its strategically ill-defined and slow-selling OS/2 Extended Edition — an operating system containing database and communications extensions that is a cornerstone of what is commonly referred to as SAA Office.

The new office automation system will include electronic mail, document preparation, decision support features and an iconic interface, IBM Vice-President Earl Wheeler said in a recent speech.

The suite of office integration applications will encompass versions for each major IBM operating system — OS/2, OS/400, VM and MVS — according to a source with access to internal IBM information.

IBM has already hinted broadly at the SAA Office strategy. Just last week, Howie Hunger, director of software vendor operations at IBM's Application Systems Division, described an upcoming announcement at which a number of independent software vendors will be present. These vendors' products will ship this year, he said. He also indicated that an announcement will come within 90 days.

Hunger said the product will center on OS/2 Extended desktop devices performing cooperative processing in Systems Application Architecture and connected to IBM Application System/400 and 370 hosts. "The desktop will contain the local data, and the host will be AS/400, 370 or a LAN server," he said.

The SAA-integrated package should mark the beginning of IBM's cooperative processing strategy and will serve as a front end to OS/2 servers, AS/400 software and the 370 family of mainframes. In the process, this software may begin to replace IBM's Professional Office Sys-

Continued on page 6

Cornell: Morris set worm loose

BY MICHAEL ALEXANDER
CW STAFF

Officials at Cornell University plan to make public today an exhaustive report that concludes that one of its students created and unleashed the worm that shut down thousands of computers on the nationwide Internet network last November.

Robert T. Morris Jr. allegedly used computers at Cornell to create the worm and inject it into the Internet network while attending the university as a computer science graduate student last fall. The worm multiplied uncontrollably, clogging the memories of infected computers until they could no longer function.

"The act of propagating the worm was fundamentally a juvenile act that ignored the clear potential consequences," the report said.

According to the university investigative commission that compiled the 170-page report, Morris was able to exploit secu-

Continued on page 100

Career-switchers use IS as first step up corporate ladder

BY ALAN J. RYAN
CW STAFF

There is something unorthodox about Patricia Wier and William McCartin. Sure, it makes sense that Wier, who holds a degree in English, is president of Encyclopaedia Britannica, U.S.A. And it is logical that William McCartin, a certified public accountant, is treasurer of Nonell Corp. But both of them got there through information systems.

IS has always been a stepping-stone, be it to other IS jobs, vice-president of IS or even chief information officer. But it is increasingly proving to be a fertile breeding ground for leaders in all areas, said Jack Epstein, chairman of Maxi/Micro Consultants and a senior consultant at International Data Corp. It is all part of the growing trend to align the

Continued on page 101



Britannica's Wier *made her way from the firm's IS department to the president's office*

Some users hack own Netview path

BY ELISABETH HORWITT
CW STAFF

A version of IBM's Netview/PC for OS/2 Extended Edition is scheduled to hit the streets in less than a month — still too late to dissuade some users and vendors from circumventing the interface and forging their own direct links to Netview.

Netview/PC workstations make expensive network management liaisons and add many potential failure points to users' networks, according to those who have turned away from IBM's product.

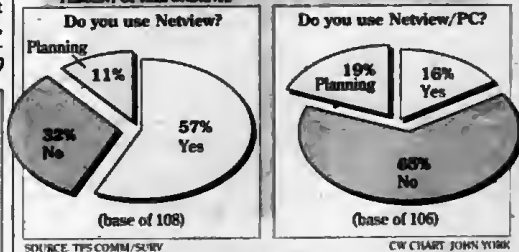
Netview/PC Release 1.2, announced last fall and scheduled to become commercially available May 2, brings greater memory and multitasking to the job of interfacing non-IBM networking devices to the vendor's host-based network management system. The existing PC-DOS-based Netview/PC Version 1.1 has come under fire from vendors and users alike for its inability to handle more than one networking application at a time.

United Airlines subsidiary Covia, Inc. has been pressuring MCI Communications Corp. to drop Netview/PC from MCI View, a service that sends alerts and alarms about Covia's communications lines to a Netview host. According to Covia technical systems development engineer Kenneth Ciesynski, "Part

Continued on page 10

Cautious approach

While IBM's Netview has gained a dominant position among surveyed sites using network management, Netview/PC has had more limited success



SOURCE: TPS COMM/SURV
CW CHART: JOHN YORK

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7 Apple claims it has a sharp edge in host connectivity.

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12 After two turbulent years, IBM's PS/2 is finally a force to be reckoned with.

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100 Strong laws, weak ethics form an unshapely computer security physique.

100 FBI sees no need to increase computer awareness of agents.

101 Computer crime is an equal opportunity employer, research firm says.

Quotable

"We are being asked new questions. Executives at the top want to know why IS is getting to be so big and whether we are getting a real payoff from it."

JAMES SUTTER
ROCKWELL INTERNATIONAL

On the need to find new ways to cost-justify IS investments. See story page 55.

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Don't get stranded by systems integration. Page 71.

UPDATE

Anniversaries this month: Following the lead of skyjacker D. B. Cooper, 15 years ago a disgruntled Oregon state worker "commandeered" an IBM 370 via a remote terminal and crashed the system. One year later, the first public warning of the coming microprocessor revolution was issued, but alas! the poor forecaster was jeered. And one year after that, a U.S. representative charged that the Social Security Administration was "hoarding" IBM 370s. Just how big were the closets back then?



JOHN MARTIN

Robert Rubin, IS director at Pennwalt, wins points by speaking in earnings-per-share. Page 55.

EXECUTIVE BRIEFING

■ **Still cost-justifying your IS investments?** The old models probably won't work anymore. With corporations looking more closely at their computing expenditures, IS managers are seeking new ways to quantify the value of what they do. Grumman puts strategic planning to work to slow the computer-cost spiral and get more for its IS dollar, while Merrill Lynch keeps a lid on expenses by bringing users more closely into the process. Stories begin on page 55.

■ **IBM's first major SAA application** is set to be announced soon. It will include a set of office functions such as E-mail and decision support that runs across mainframe, mini and PC platforms and transparently exchange files. Officials say the so-called "SAA Office" is tailor-made for users with multiple hardware platforms. Page 1.

■ **Information systems can be a springboard** to top management positions, some pros find. But success usually means putting in extra hours and getting deeply involved with the business. Page 1.

■ **When systems integration projects fail,** it's usually because of poor problem definition, insufficient knowledge of the application or communications lapses. Use steering committees to make requirements clear, find a technical person who knows the application and keep a knowledgeable end user close to the project to avoid the pitfalls. Page 71.

■ **Find an executive sponsor** to help you sell executive information systems to your top management, a recent Arthur Young report says. Page 49.

■ **One of the earliest strategic IS projects** is moving up. Baxter Healthcare's purchasing network, known in the IS world as the American Hospital Supply system, is migrating from terminals to PCs as customer ordering devices at more than 6,000 U.S. hospitals. Page 33.

■ **More Microvaxes are on the way,** and DEC is hoping these newest souped-up models will take some steam out of the AS/400 express. Page 7.

■ **Response-time relief** comes to a North Carolina insurance organization, one of the first users of Data General's new high-end computer. Response times dropped from 45 seconds to four seconds. Page 25.

■ **Put yourself in the user's place.** You don't expect your hardware vendor to simply walk away after the sale. Do users deserve any less consideration when you deliver an application to them? Page 17.

■ **EDS safeguards** its worldwide network with a billion-dollar central facility in Texas. The project is intended to keep the EDSnet network going 24 hours a day and centralize operations, maintenance and engineering. Page 12.

■ **How about renting that PC instead?** More companies are doing just that to avoid obsolescence and handle spot computing needs. Good news: Increased competition is forcing rental rates down. Page 91.

■ **An early MAP supporter** went with Decnet instead; Boeing cites established products, off-the-shelf software as driving forces in its decision to give DEC a major contract. Page 45.

■ **Short takes:** You'll be able to buy that whiz-bang Next machine without going to college after all. But it will cost $10,000 at Businessland stores, page 4 . . . Start-up releases an input device that you wear like a glove while moving items on screen by hand, page 6 . . . Women and minorities are more likely to commit computer crimes than you may think, and current and former employees are your biggest security threat, according to a new study, page 101 . . . Nine out of 10 executives use PCs, a *Fortune* survey finds, page 102.

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Next goes retail at premium price

BY JULIE PITTA
CW STAFF

SAN FRANCISCO — There has been a change in plan at Next, Inc. — its Unix workstation is no longer just for college users. The firm outlined plans here last week to sell the system — with a significant markup — to corporate users through Businessland, Inc.

Six months ago at the introduction of the firm's first system, Next Chairman and President Steve Jobs said the machine would be available only to institutions of higher education.

With Businessland, "Jobs is going back to the people who brought him into the corporate market in the first place," said Richard Schaffer, editor and publisher of "The Computer Letter." Businessland is considered the retailer most responsible for selling Apple Computer, Inc.'s Macintosh to large firms.

Businessland President Dave Norman predicted the Next system will be a best-seller, exceeding $100 million in sales during the first year. "We believe our sales of Next over the next 12 months will be as great as sales of Compaq were over the last 12 months," Norman said. Compaq Computer Corp., which recently dropped Businessland, accounted for $150 million of Businessland's $1.2 billion in sales last year, he noted.

The Next workstation has sold for $6,500 to universities, and 1,000 units have been shipped since deliveries began 90 days ago. The workstation will sell for $9,995 through Businessland.

Acceptance of Unix outside technical environments has been slowed by a lack of general-purpose personal computer software. Next officials said Lotus Development Corp. and Aldus Corp. have committed to developing products for Next. Additionally, Novell, Inc. will port Netware, its local-area network software, to Next, giving it the ability to tie into IBM Personal Computer and Macintosh LANs. As yet, there are no release dates for those products.

Before the press conference, Ashton-Tate Corp. and Apple spin-off Claris Corp. had been said to be developing for Next. Claris Marketing Vice-President John Zeisler said Claris staff recently attended a developer's camp hosted by Next but has not made a firm commitment to develop for the system.

Next will sell exclusively to Businessland, according to the retailer, and it will be the first Unix-only workstation it will sell. Businessland also said it will sell AIX, IBM's version of Unix, for its Personal System/2 line, and A/UX for the Macintosh.

Jeff Mason, IBM's director of advanced workstations and AIX systems, said that the PS/2 provides users with a low-cost alternative to the IBM RT, which already runs AIX. "The PS/2 offers you a lower priced entry point to AIX than the RT does, so it would be attractive to people who don't need the power of an RT," Mason said.

Businessland carried the RT three years ago but dropped it less than a year ago. The firm has been evaluating other Unix workstations for more than a year.

Among the firms said to have been considered is Sun Microsystems, Inc., long rumored to be interested in the retail channel. However, sources said that Sun would not offer Businessland exclusive rights to its products.



ROBERT HOLMGREN

Next's Jobs *opens up his workstation to a new market*

Shaffer predicted that the Next-Businessland relationship will prove fruitful for both parties. "There's no question they'll do the volumes they're talking about," he said. "With the size of Businessland's sales force, each salesman would only have to sell about one machine a month to make it happen."

Downturn seen as no cause for panic

BY NELL MARGOLIS
CW STAFF

Industry analysts kept a stiff upper lip last week even as Unisys Corp. became the third major hardware vendor to forecast lower first-quarter earnings.

Softening demand for computer hardware and software, blamed for recent earnings slides, portends an industry shift but not a collapse, they said.

Unisys tagged its coming loss, now estimated in the $60 million to $80 million range, to three factors:

- A freeze in orders of an older family of mainframes as customers awaited a new line.
- The suspension of certain defense-related contracts.
- The high cost of the company's recent reorganization.

In addition to these "unusual first-quarter disruptive factors," Unisys cited "the continued industrywide weakness in the U.S. computer business" as responsible for the disappointing earnings report.

"Absolutely, there is a weakening of U.S. demand," said Ulric Weil, an analyst with Weil & Associates in Washington, D.C. Government figures on factory orders released late last week marked the biggest drop since last July, with nondefense-related capital goods taking the hardest fall. "The information technology sector has grown too big to be immune to macroeconomic shifts," Weil noted.

However undeniable, he added, the trend is not irreversible. With rare exceptions, senior management has seen little quantifiable payoff from big investments in information technology to date. The result, Weil said, is extreme caution about where — or even whether — the next technology dollars will be spent.

Another roadblock for decision makers is the profusion of choices at every level, from products to protocols to philosophies, noted John Imlay, chief executive officer of Management Science America, Inc.

"Demand remains," Imlay said, "but it's complicated by confusion and frustration."

In addition, said Dale Kutnick, president of Meta Group, Inc., a market research firm based in Westport, Conn., there has been little reduction in the prices of large systems. This fact further contributes to what Kutnick called "a minor slowdown in the industry, but nothing to panic about." Many of the individual circumstances that companies — prominently, IBM, Digital Equipment Corp. and Unisys — have claimed as responsible for their faltering earnings are attributable not to changes in buying patterns but to changes in users, Kutnick contended.

Increasingly sophisticated and demanding users, be said, "are not willing to buy promises any more. There's plenty of demand out there, but only for the right products."

Vendors, he explained, are just now waking up to the fact that, while yesterday's users could be sold, today's demand to be satisfied. Invariably, be added, they are finding that waking up is hard to do. This accounts for the product-transition woes that are hobbling Unisys and still slowing IBM and DEC.

CORRECTIONS

The Irix operating system is a trademark of Silicon Graphics, Inc., not Control Data Corp. as reported [CW, Feb. 27].

It was incorrectly reported that AT&T is phasing out its Information Systems Network (ISN) in favor of its Datakit II Virtual Communications System [CW, March 20]. While users can migrate from its ISN switch to the Datakit II, AT&T said it "has no plans to discontinue ISN."

Infodata Systems, Inc. is located in Falls Church, Va., not at the location reported in the article "Text retrieval finds its home" [CW, March 20].

It was incorrectly reported that Andor Systems, Inc. will not introduce a low-end mainframe as originally planned [CW, March 27]. Andor is continuing development of its mainframe CPU but also said it plans to use it in a storage product that will be introduced before the mainframe is completed.

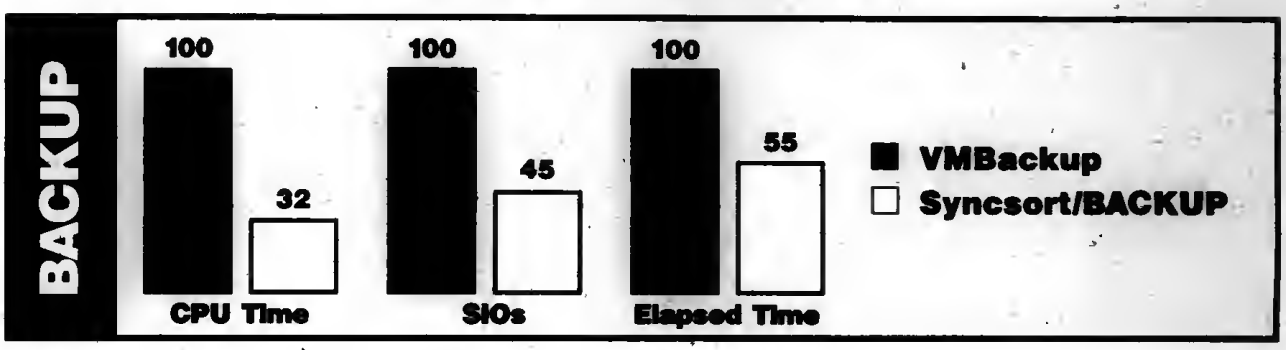
Knowledgeware, Inc.'s IEW/Gamma, a full life cycle computer-aided software engineering (CASE) package running on IBM and plug-compatible mainframes, and IEW Construction Workstation, also a full life cycle CASE product for the IBM Personal Computer, AT, Personal System/2 and compatibles, should have been listed in the Spotlight vendor chart of back-end CASE tools [CW, March 27].

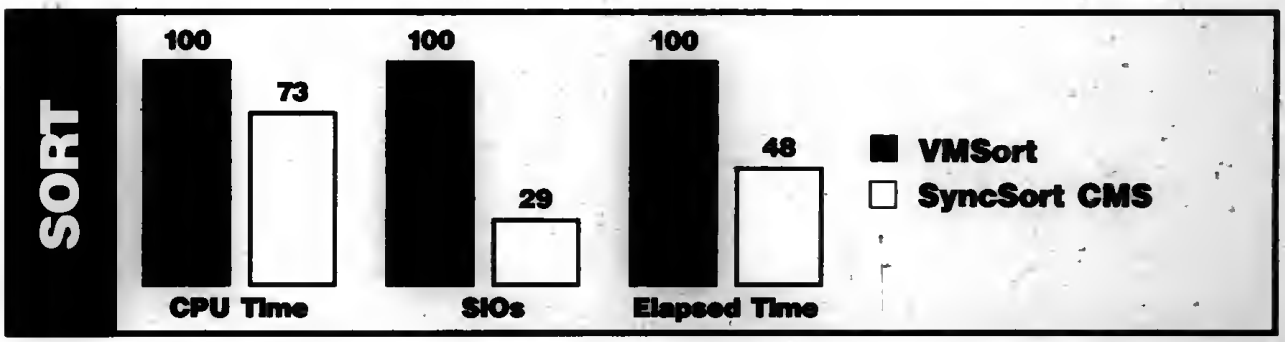
In the same Spotlight chart, the phone number for Quantitative Technology Corp. should have been 503-626-3081.

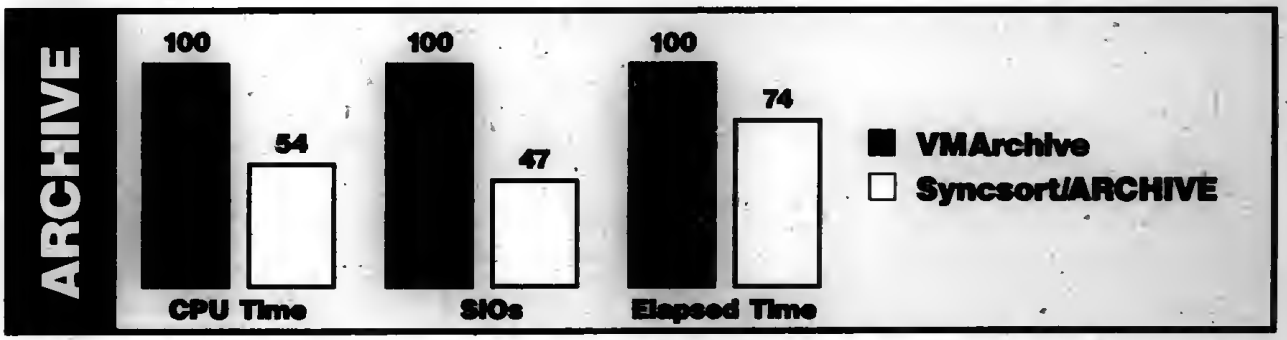
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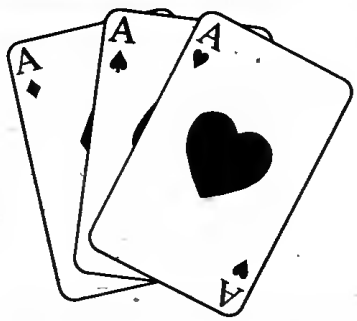
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Spandex Dataglove: A handy PC tool

BY JULIE PITTA
CW STAFF

REDWOOD CITY, Calif. — All it takes is sleight of hand.

The black spandex glove isn't likely to send droves of teenagers to nearby shopping malls.



ROBERT HOLMGREN

What you can do *with gloves on*

But it might become trendy with computer users. No mere ornament, the glove is a computer input device created by Silicon Valley start-up VPL Research. For some applications, it could replace traditional input devices such as keyboards and mice.

Researchers at MIT's Media Lab were among the first to experiment with the glove. Using Hewlett-Packard Co.'s 825 SRX workstation as a hardware platform, the lab created three-dimensional graphics software to work with the device. Three-dimensional objects stand stationary until the animated hand — following that of the gloved researcher — grabs a computerized image and hurls it. The ball flies across the screen at a speed and distance dictated by the laws of gravity, as mandated by the software program.

"With traditional computer-aided design, you have to decide what will happen to the object you're working with, and then the computer illustrates it," MIT computer researcher David Sturman said. "The idea here is that you don't know what's going to happen."

Slip it on and the Dataglove creates a kind of computerized magic. Hold your hand up to the computer display and an animated likeness of it appears on screen. Make a fist and the animated hand clenches. Point your index finger and it duplicates the gesture in real time.

Residing on the Dataglove are optical sensors on each of the 10 major joints of the hand. A polhemus, which looks like a plug on an electrical cord, is attached to the glove. The polhemus creates the magnetic field so that the computer can identify the actual location of the glove and monitor its movements.

The glove and polhemus are then connected to an external box the size of a personal computer base via a fiber-optic cable. The box, or glove control unit, performs analog-to-digital conversion so optically recorded impulses sent to it can be translated into data and transformed into images by the workstation.

VPL's team is hoping that the glove is adopted by more than the computer elite. Before it sees more general use, its price — $8,000 — will have to come down, and there will have to be applications software to take advantage of its capabilities. "It brings the computer to meet the person's way of working, rather than the person having to meet the computer's way of working," said Dataglove inventor and VPL President Jaron Lanier.

Down to earth

The glove is not as futuristic as it may appear. VPL has created a version that will replace a joystick used in Nintendo video games. Mattel, Inc.'s Power Glove will sell for $75 next fall.

Creation of the glove was originally funded four years ago by the NASA Ames Research Center in Mountain View, Calif.

NASA Ames is using the Dataglove in a robotics experiment. A human operator wears it and a computerized helmet equipped with two small LCD screens near the operator's eyes.

On the screen is an image of a robot at a remote site. Movement of either the hands or the head activates the robot. An optical camera at the site will pick up impulses from the operator and send it to the robot.

SAA

FROM PAGE 1

tem as the office communications system of choice for large IBM customers, analysts said.

Users on all three architectures will be able to exchange documents and messages transparently without consciously switching from one office automation environment to another, said John Dunkle, vice-president of Workgroup Technologies, a Hampton, N.H.-based market research firm.

On the user side, there is a two-pronged strategy. SAA Office applications will run as text-based applications on IBM 3270-style terminal devices and will not look or feel like the Presentation Manager, according to the source knowledgeable about IBM's plans.

The terminal-based applications will also be unable to implement cooperative processing techniques because existing terminals have little or no intelligence. Within IBM, the source said, "The strategic thrust is Presentation Manager." It is not clear how effectively terminals will be able to work with personal computer.

On IBM Personal System/2-style machines, SAA Office applications run under the OS/2 Presentation Manager and also require key elements of OS/2 Extended Edition. Prior to loading SAA Office on a workstation, users must load OS/2, Presentation Manager and OS/2 Extended's Advanced Program-to-Program Communications (APPC), local-area network-oriented file and print redirectors and portions of the Data Manager, the source said.

Analysts speculated that to supply a Presentation Manager-compliant user interface for host-attached devices at a reasonable price, IBM will have to introduce so-called "intelligent workstations" that are essentially diskless PS/2s.

Such devices would need to be priced close to $2,000, according to Dale Kutnick, an analyst at Meta Group, Inc. in Westport, Conn. At press time, no definitive information was available on a possible hardware announcement tied to SAA Office.

A PS/2 or intelligent workstation calls into memory the bulk of the user application from a server. The back-end server contains documents, files, mail and program code, all of which sit in relational databases, the source said. Observers pointed to OS/2 Extended, SQL/DS, DB2 and OS/400 as likely targets. The client workstation requests data or documents from the host using APPC.

"If you are accessing a document, the library services that store-and-forward and handle the document will be on the server," the source said. This server could be an AS/400, a 370-style mainframe or a PC-based LAN Server. "You also have programs on your workstation that get the document from the server," the source said.

To accomplish this task, IBM programmers have built a set of services that work with APPC to provide common access to the firm's different platforms. For example, there will be a common way to request mail that works with all three levels of supported hardware, the source said.

Customers and third parties will also be able to use these services to develop their own cooperative-style applications. For example, a mainframe spreadsheet could run largely on the host with Help files and the user interface residing on a PC. Trax Software has designed its spreadsheet for such an architecture, said Tom Cox, director of marketing at Trax.

Integration appeal

As an example of office automation functions and business applications being integrated, John Birch, head of midrange systems development at McCormack & Dodge Corp. in Natick, Mass., pointed to the integration of M&D's Millennium financial packages with Digital Equipment Corp.'s All-In-1. He said a Millennium report can be joined with a WPS Plus document and the result sent via electronic mail. Birch suggested that such capabilities would be likely with Millennium and an SAA Office product.

Richard Crandall, president and chief executive officer of Comshare, Inc., a maker of executive information software (EIS), said his firm will soon announce an enhancement to Commander. Readymail will send annotated EIS screens to IBM's Professional Office System. "Those facilities will be integrated into any other IBM office automation product," he said.

The common-user interface implemented in SAA Office workstations has great appeal for Phyllis Koch, supervisor of the advanced technology center at Ryder Truck Rental, Inc. "The whole idea of SAA has tremendous appeal. I work on PCs, Application System/400s and even mainframes. I never know what key I'm pushing, and I'm in MIS," she noted.

MIT ends 'Buy American' battle

BY JAMES DALY
CW STAFF

CAMBRIDGE, Mass. — A little federal arm-twisting can go a long way. Just ask MIT.

When the school confirmed recently that it is drawing up final plans for a Cray Research, Inc. Cray-2 supercomputer, it cooled a "Buy American" battle that has simmered between MIT and the federal government for nearly 1½ years.

The dual-processor machine, which could arrive as early as June, is expected to serve several dozen MIT faculty members and sweeten the school's draw for faculty and graduate students, said Kenneth Campbell, director of MIT's news office.

But trouble developed soon after school officials began shopping around for a supercomputer in late 1987. Several companies' machines were initially considered, including ones from Cray, ETA Systems, Inc., Fujitsu Ltd. and NEC Corp., Campbell said.

Word leaked out that the Japanese firms were prepared to offer MIT some very attractive incentives. Both companies habitually offer large discounts to Japanese schools. A contract with the school would not only provide an extremely large feather in either company's cap but also would gain the victor a significant toehold in a large educational institution.

Word drifted down to Washington, D.C., and the U.S. Department of Commerce, where then-acting Secretary Bruce Smart dashed off a letter to MIT President Paul Gray. Smart said he had no objections to shopping around but reminded Gray that any special deal the Japanese might cut could be subject to antidumping proceedings.

MIT realized it was being faced with an offer it couldn't refuse. "It became clear that important elements of the federal government would prefer to see MIT acquire a supercomputer based on U.S. technology," MIT Provost John Deutch said.

Deutch conceded that the federal government would ultimately bear nearly all of the cost for the machines through research grants to MIT. Therefore, "the preferences of the U.S. government must be seriously assessed," he said.

Negotiations with Fujitsu and NEC were subsequently suspended.

Microvax upgrades to aim at AS/400

BY JAMES DALY
CW STAFF

MAYNARD, Mass. — Digital Equipment Corp. is hoping to take a bite out of the high end of IBM's successful Application System/400 line next Monday when it adds two souped-up models to its popular Microvax 3000 series, according to sources close to DEC.

Analysts claim the Microvax 3800 and 3900, along with the concurrent rollout of a solid-state storage system, stand a good chance of crawling through a recently opened midrange window of opportunity.

While pent-up demand caused explosive early interest in the 10-month-old AS/400, the initial ordering wave has crested and broken, resulting in a lull that DEC hopes to exploit with the new Microvaxes.

Both models are expected to use the same CMOS microprocessor as the VAX 6300, providing a processing speed of 3.8 million instructions per second. The 3800 and 3900 will have base prices of $81,000 and $120,000, respectively, said Marc Schulmann, an analyst at UBS Securities, Inc.

If the duo proves to be dynamic, it could help DEC wake from its fiscal slumber. Company officials warned recently that weak domestic sales will result in third-quarter revenue being lower than expected.

Desktops offer slim profits

A recent flurry of competitively priced introductions for the desktop will do little to change that predicament, observers said, because those models are aimed at stemming the outflow of DEC users to other vendors and offer only slim profit margins. The Microvax line, however, enjoys much higher margins. If successful, the 3800, 3900 and solid-state storage system could significantly stoke DEC's financial furnace.

The new models could also be the last uniprocessor-based Microvaxes, said John Logan, an analyst at The Aberdeen Group research firm.

Analysts predicted that DEC will trumpet the machines as on-line transaction processor (OLTP) front-end processors in much the same way that the Microvax 3300 and 3400 were touted upon their introduction last October.

"OLTP is one area where the AS/400 has thus far not set the world on fire, and the 3800 and 3900 could make a very effective argument there," said Terry Shannon, director of the DEC Advisory Service at International Data Corp.

Apple claims to have an edge in host connectivity

BY ELLIS BOOKER
CW STAFF

CHICAGO — While it cannot supplant the mainframes that dominate corporate America, Apple Computer, Inc. claims it can offer superior ways to access, process and present the information contained in those host computers.

That was the message to Midwest users at the two-day Macintosh Connectivity Conference here last week. Meanwhile, there was strong evidence that Apple will plug some holes in its connectivity product line in June.

"The Macintosh adds value as a front end and personal workstation for corporate information," said Morris Taradalsky, vice-president of customer services and information technology at Apple USA, in his keynote speech. Illustrating his remarks with a Macintosh demonstration, Taradalsky reviewed Apple's various links to the non-Apple world.

"Connecting into MS-DOS and OS/2 environments is also a priority for Apple," Taradalsky said, perhaps obliquely referring to the rumored, long-awaited announcement from Apple of a Token-Ring adapter for the Macintosh. Currently, the Macintosh cannot link directly to a Token-Ring network, although it can be bridged to these networks using third-party products such as Novell, Inc.'s Netware.

Apple sources confirmed that the company has scheduled a multiproduct announcement for June on the East Coast, but Apple executives refused to confirm any product plans.

"We will solve that problem [of the Token-Ring card]," said Charley Pitcher, Apple's systems software manager of U.S. product marketing.

In the exhibition area, a vendor said his company had been told by Apple to "be ready to participate" in a June announcement. The vendor — one of 32 showing Macintosh connectivity products — said an upgraded version of Appletalk will also debut in June.

The source, who asked not to be identified, said the new Appletalk will facilitate more connections to devices but will not increase the product's often-criticized 230.4K bit/sec. speed.

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NEWS SHORTS

Prime and MAI each claim a win

Prime Computer, Inc. and its would-be acquisitor, MAI Basic Four, Inc., both claimed victory last week after a federal appeals court upheld an earlier district court order continuing an injunction against MAI's tender offer for Prime. The ruling marked at least a temporary win for Prime in the tangle of takeover-related legal actions in which the companies are ensnarled. However, MAI has said it will disclose the information that the appeals court said is necessary to vacate the injunction.

Animation wins an Oscar

Pixar of San Rafael, Calif., is claiming the first Academy Award for a computer-animated film. Two Pixar employees, John Lasseter and William Reeves, received statues in the Best Animated Short Film class last week for *Tin Toy*, a five-minute film about a baby and a toy. "It didn't look like a home movie, but it didn't have the bright colors or hard angles usually associated with animation. The baby was fat, soft and round," said a spokeswoman about the film's attempt at photorealism.

Sematech produces first wafers

Sematech finished its first lot of semiconductor wafers last week, beating its deadline by three days. The lot was produced less than a year after Sematech set up shop in Austin, Texas. Sematech, a consortium dedicated to semiconductor production, hopes to identify production line efficiencies for its member companies. The consortium includes such computer vendors as Digital Equipment Corp., IBM, Hewlett-Packard Co. and NCR Corp. as well as major chip makers Intel Corp., Motorola, Inc. and National Semiconductor Corp.

Net standard advances

The Open Systems Interconnect/Network Management Forum last week submitted draft specifications to its members for Application Services, the next major piece of OSI-based network management to be proposed by the 59-vendor consortium. The document defines message sets that, if adopted by vendors, would ensure that their network management systems would be able to exchange fault and configuration management information using OSI protocols. In addition, the Forum also announced that Societa Finanziaria Telefonica S.p.A., an Italian telecommunications firm, has become its 14th voting member.

Pilot expands with Thorn EMI pact

Boston-based executive information systems vendor Pilot Executive Software last week reached agreement to buy the U.S. operations of worldwide decision support systems firm Thorn EMI Computer Software, a subsidiary of British giant Thorn EMI. The deal blasts Pilot from a customer base of 150 to one of 800 U.S. organizations and coincides with Pilot's introduction of support for the IBM MVS environment, according to the company.

Remote troubleshooting for 3Com

Users of 3Com products will gain remote on-line access this week to 3Com service engineers who will troubleshoot 3Com networks. Customers with 3Com Infoline, Express and Guardian service contracts will receive free software designed to allow 3Com to manage and tune user networks.

Fiber net packs 100M-bit speed

Simple Net Systems, Inc. said it has shipped the first commercially available 100M bit/sec. Fiber Distributed Data Interface (FDDI) network for Intel Corp. 80286- and 386-based micros. Laserlan Plus uses Advanced Micro Devices, Inc.'s Supernet FDDI chip set and features a full-size 16-bit adapter card with 128K bytes of on-board packet buffer memory, a 125M bit/sec. transmission rate, Novell, Inc. Netware drivers and a proprietary Nethios OSI-compatible interface.

Motorola 68040 latest salvo in chip battles

BY JULIE PITTA
CW STAFF

AUSTIN, Texas — Motorola, Inc. last week fired the latest shot in the microprocessor wars with the debut of its 68040 chip.

Its rival, Intel Corp., is expected to introduce its 80486 microprocessor at Comdex/Spring '89, to be held April 10-13 in Chicago. Details on the 80486 remain undisclosed.

Users of workstations based on Motorola's 68000 family should be heartened by the faster version of the chip, which will run software applications used on previous Motorola-based systems without any alterations.

Hewlett-Packard Co. was the first vendor to say it will design workstations based on the 68040. HP also markets Intel-based personal computers and a line of workstations based on its proprietary reduced instruction set computing (RISC) microprocessor.

Apollo Computer, Inc. and Arix Systems Corp. are also expected to adopt the 68040.

Not all of Motorola's longtime customers may follow suit, however. Sun Microsystems, Inc. has yet to incorporate the new chip's predecessor — the 68030 — into its line of workstations. Industry analysts have said that Sun has been reluctant to adopt the 68030 and 68040 because both offer performance comparable to Sun's Scalable Processor Architecture, its version of RISC. Sun officials have said RISC will offer superior price/performance compared with traditional architectures and will eventually replace them.

HP will augment desktops

Doug Johnson, HP's product marketing manager for workstations, said the company will continue to augment all three of its desktop computer lines.

"We have a large installed base of customers who have purchased Motorola workstations from us," Johnson explained, noting the installed base numbers 100,000. "We see many of them adding a RISC node, but we don't see them pulling the plug on what they have already."

Johnson said he estimates that HP's 68040-based workstations will offer three to five times the performance of the 68030. Maximum performance will be achieved in floating-point applications, he said, adding that such applications make up the bulk of those used by HP's Motorola workstation customers.

According to Motorola, the new chip squeezes 1.2 million transistors onto a single chip. It combines integer, floating-point and memory management functions on a single chip as well as separate caches for data and instructions.

Additionally, it features a "snoopy," first used on Motorola's 88000 RISC processor. The snoopy is a hardware mechanism designed to relieve the burden on the operating system during multiprocessing.

Pricing and availability of the chip will be announced later this year. At that time, Motorola is expected to release more specific performance information.

Alice Leeper, senior industry analyst at Dataquest, Inc. in San Jose, Calif., said the 68030 and 80486 should be "comparable" in performance.

Baseball system set for opening day

BY CLINTON WILDER
CW STAFF

NEW YORK — Like all good baseball men, Dave Alworth spent the off-season winter months trying to improve his team and have it in perfect shape for Opening Day. That day has arrived at last, and Alworth's team is ready.

Alworth is Major League Baseball's director of baseball information systems, and his team is two IBM System/38s linked to personal computers at all 26 American and National League ballparks. For the second season, this network will provide teams and the media with updated baseball statistical reports every day from now through October.



FRANK C. O'CONNELL

While baseball owners were busy making trades and haggling over player salaries during the off-season, Alworth and his staff were busy fine-tuning software to capture even more of the national pastime's intricate nuances. They changed the way the application records double plays that end with a tag rather than a forceout, players who change defensive positions during a game and pinch hitters or relievers who join the game in the middle of an at bat.

Alworth's team also got itself a new home — not a domed stadium, but a new 1,500 square-foot modern computer room at Major League Baseball headquarters in midtown Manhattan.

Called the Major League Baseball Information System, the IBM-sponsored application debuted last year to automate the process of recording each game [CW, Aug. 15, 1988]. At today's Reds-Dodgers opener in Cincinnati and every game throughout the season, a home-team employee will record every at bat on a laptop computer, transfer the diskette to a Personal System/2 and upload the game data at 9.6K bit/sec. to New York.

The next morning, each team will receive updated data in 320 different statistical categories ranging from the Mets' record in night games on artificial turf to the Royals' team batting average against lefthanders.

The software program produces an inning-by-inning, batter-by-batter summary of each game from the data entered.

"The pencil and paper tradition passed from grandfather to father to son on warm summer afternoons is not really lost when you enter the data on a keyboard," Alworth said. "The software generates end results that are very similar to the traditional ones. The play-by-play text is like an old radio broadcast."

The application also yields a detailed box score with fielding totals and pinch-hitting results — a daily sports page staple decades ago but now generally reserved for the All-Star Game and World Series. "We're going back to the way the game developed and using modern technology to capture that," Alworth said.

Like the players and fans, Alworth has been counting the days until today's first pitch. The final versions of the software program were sent to each team last week, and Alworth was set to double-check the 26 team rosters this morning for any last-minute trades or minor-league demotions. When scheduled Cincinnati hurler Danny Jackson christens the 1989 season with his first pitch this afternoon, Alworth's computers will be ready.

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1. IBM Journal of SAA 2. DATAPRO survey, August 1988, companies with sales over $10 million 3. Donaldson, Lufkin & Jenrette report

Humane Society collars a chip off the old hound dog

BY J. A. SAVAGE
CW STAFF

NOVATO, Calif. — Dolly is a protodog — specifically, dog No. 7F7E482105. She's one of the first pets in Northern California to partake in an international database aimed at retrieving lost animals and preventing euthanasia.

Dolly sports the latest dog technology — a microchip tucked under her fur between her shoulder blades. Beginning the first week of May, Be Kind To Animals Week, the Marin County Humane Society will begin injecting microchips the size of a grain of rice into animals up for adoption. The pilot project is the largest so far in an effort to build a pet database.

"We may lose some money on it, but they may lose their lives," said Diane Allevato, the humane society's director. Allevato said she expects to "chip" nearly 2,000 animals the first year. After a few years she said she hopes to have enough animals in the database to see if the identification system actually helps reunite pets with their owners.

The usual $40 injection and classification fee will be subsidized by both the humane society and the vendor, International Infopet System, Inc. in Agoura Hills, Calif. Any adopted pet will come with a microchip.

If, for instance, Dolly jumped her fence and was picked up as a stray, shelter personnel would wave a scanner over her back. The scanner would activate the chip and pick up a 10-digit number that appears on a battery-powered display. That number would be called into Infopet's hot line. From there, Infopet would check into dual databases residing on two IBM System/36s — one in Toronto and the other in Agoura Hills.

"Then, either we or the animal control officer would call the owner and let them know where the animal is," said Ed Burnell, Infopet's vice-president of information systems. Burnell said that the database can hold as much information as needed on the animal, including the breeder's name, whether it is vicious and details of any medical problems.



MARVIN COLLINS

Allevato *with protodog Dolly*

Burnell said that the implants have been available for a fee in clinics throughout Canada since last July. In the U.S., they have been used by some shelters and veterinarians on an optional basis since the last quarter of 1988.

Cats are expected to benefit most from being chipped. If a cat is missing, people assume they are out "catting about," Allevato said. Often, by the time an owner realizes the cat is actually missing, it may have been put to death. Allevato said that her shelter is currently able, without the microchip implants, to reunite 85% of the stray dogs but only 12% of the cats.

Netview

CONTINUED FROM PAGE 1

of the problem is plain, simple cost."

An early user of MCI View, Covia would need to install a separate Netview/PC workstation — $1,800 for the software plus the price of an IBM Personal Computer — for each of the many local-area networks it has implemented at Chicago's O'Hare Airport, as well as at travel agencies, he explained.

Several other large firms have rolled their own software to bring non-IBM networking devices under Netview management. American Express Co.'s Worldwide Telecommunications subsidiary recently implemented direct links between non-IBM terminal controllers and Netview. Its reasons for avoiding Netview/PC, as described by the director of the Netview interface project, Brian Brener, are exactly the same as Covia's: the desire to minimize expense and failure points.

Sears Technology Services, Inc. is a third company to circumvent Netview/PC as an economy measure. The Sears Roebuck & Co. subsidiary has already developed a direct link between Netview and Series 1s controlling a wide variety of non-IBM devices. "The Series 1s were already generating alerts and alarms for attached equipment; it was a small developmental effort to format the information to go to Netview," said the subsidiary's senior vice-president, Gary Weis. Making that effort has saved Sears the cost of "hundreds, if not thousands" of Netview/PC workstations, he added.

While Netview/PC Release 1.2's $3,150 price tag is considerably higher than that of Release 1.1, the new version allows users to address cost and point-of-failure issues by consolidating multiple Netview/PC and third-party network management applications on the same multitasking OS/2 Extended workstation, said IBM spokesman Gregory Smith. The problem is that porting existing third-party network management systems to OS/2 "would cost a lot of bucks," said Telwatch, Inc. spokesman John Brinegar.

Telwatch became one of the 10 early developers of Netview/PC 1.2 applications because supporting the interface "provides entry into true Blue shops," Brinegar said. The vendor is planning a summer release for Netwatch, a transmission line-monitoring device that will feed alerts to Netview via the new interface, Brinegar said.

But Telwatch is also working on a multivendor network management system, Netexec 2000, that "does not need an extra piece of hardware" between it and Netview, he added. If OS/2 had been available two or three years ago, Telwatch might have developed the product to share a workstation with Netview/PC, but now it is too late.

Just couldn't wait

It may be too late for IBM to sell Netview as a telecommunications network management centerpiece — at least to large corporations that decided several years ago that they could not afford to wait for vendors to deliver multivendor network management.

One such firm is Electronic Data Systems Corp. (EDS). "We put a burr under IBM's saddle to develop Netview" as a multivendor system, "but we can't wait," EDS Vice-President Clay Johnson said. Last week, the GM subsidiary opened its Information Management Center, a huge facility for managing EDS' worldwide network and data processing centers.

Netview manages "everything SNA," while internally developed applications handle a wide variety of non-IBM networking equipment, said EDS' manager of network development Peter Abene. EDS found Netview/PC to be "very wanting in its ability to control elements," even limited to the Systems Network Architecture (SNA) realm, Abene said.

EDS still needed to link the SNA and physical networking sides in order to pinpoint trouble spots quickly, he said. Far from being the central manager, Netview feeds SNA network data to EDS' internally developed system, Abene said.

In the future, Netview will become just "one more element under our network management umbrella," Johnson said.

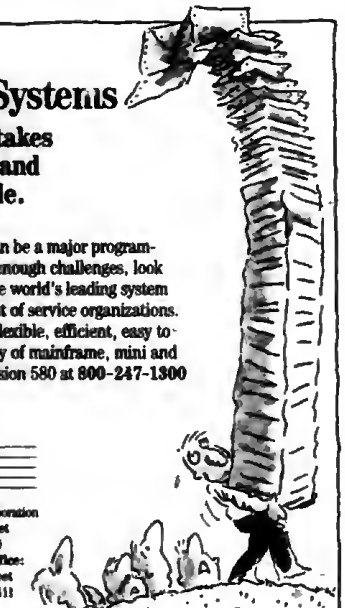
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Skirting Netview/PC

- **Digital Equipment Corp.** is evaluating how to link up to Netview via LU6.2 or Open Systems Interconnect's Common Management Information Protocol but definitely not via Netview/PC, a spokesman said.
- **MCI Communications Corp.** plans a future release of its MCI View product that will send alerts and alarms to Netview via Netview/PC but will additionally provide a direct LU6.2 link for Netview hosts to reconfigure and control MCI networks.
- **3Com Corp.** and **Communications Solutions, Inc.** announced two products last January that interface directly with Netview: Maxview, said to send alerts from a 3Com Network Control Server; and 3+Open Manexs 2.0, said to send alerts and receive commands.
- **Bytex Corp.** and IBM jointly developed Matrix Switch Host Facility 2, announced last September, which is said to allow Netview applications to send commands to Bytex's matrix switches. Through the switches, Netview hosts can reconfigure network devices (such as modem banks) at the port level in response to alerts and alarms delivered via the Netview/PC interface.
- **Data Switch Corp.** offers Totalnet, which is said to configure and collect alerts and alarms from a variety of systems and also act as a direct interface to Netview. An enhancement scheduled for the third quarter will allow users to generate Netview Command Lists to send commands down to non-Systems Network Architecture devices via Totalnet.
- **Netquest Corp.** announced earlier this year a line of modem controllers that are said to interface non-IBM modems directly to Link Problem Determination Aid, a Netview diagnostic application that IBM designed for its own modems.

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PS/2 split hits two-year mark

ANALYSIS

BY DOUGLAS BARNEY
CW STAFF

BOCA RATON, Fla. — Two years and one day ago, IBM announced the Personal System/2 line of personal computers and its Micro Channel Architecture (MCA) bus, ushering in one of the most virulent debates in computer history.

At the time, the industry as a whole viewed the line as a stab at bringing back proprietary PC systems, with virtually no advantage over existing open systems. Like a good wrestling match, the debate was couched in terms of good vs. evil.

In fact, many large shops have embraced the PS/2, but the argument still rages on as most smaller shops buck the PS/2 trend.

Cloners clearly had IBM on the ropes during the early rounds in the match of words and market share. Because old boards would not work and old floppies failed to fit, the PS/2 stalled. IBM was further castigated for yanking its popular IBM Personal Computer XT and PC AT off the market despite continuing demand.

IBM, however, had battened down the hatches for a long, bloody siege. After two years of enhancing the line and garnering the support of board makers, the PS/2 is finally a force to be reckoned with. It has also created a fundamental split in the industry.

Many users are still utterly unconvinced of the MCA's benefits. "We haven't purchased or even had a demo in our shop. I haven't seen anything to outdistance it from some of the high-end PCs on the market," said Tom Kovacs, MIS manager at Wickes Furniture, a division of Wickes Companies, Inc.

Even though IBM has paid a visit to Santa Fe Braun, Inc. to pitch the PS/2, Joe Croupe still does not possess a single machine. "We haven't even looked into it," said Croupe, operations manager at the California-based oil company.



IBM's PS/2 *has spurred heated debate*

IBM moved at a snail's pace to describe the benefits of the MCA, which early on was touted with such vague platitudes as providing a more "balanced" system. The firm was even slower in demonstrating the benefits with next-generation add-on boards, which are only now starting to trickle in.

Lost in the banter and battles is the fact that the Micro Channel is a fundamentally more capable bus architecture than the older AT-style bus. That message has only recently been promoted, since a coalition of IBM competitors announced its own 32-bit architecture that implemented many features similar to those of MCA.

IBM is now locked in a vicious battle with the Extended Industry Standard Architecture (EISA) group of vendors that has thumbed its collective nose at IBM. EISA member Compaq Computer Corp. continues to argue that buses such as the MCA — and even EISA — offer no advantages to single-user machines. Instead, Compaq will position its EISA machines as departmental servers. This is a fight that will not be waged until later this year, when EISA machines are scheduled to ship.

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PLANO, Texas — Seeking to bolster its credibility as a complete systems integrator, Electronic Data Systems Corp. (EDS) last week officially opened its Information Management Center, a gigantic facility meant to ensure reliable delivery of networking and data processing services to 6,000 customers.

By consolidating engineering, operations, maintenance and planning personnel and systems into one facility, EDS will be better able to leverage these resources and management personnel and will pass the resulting cost savings on to its customers, according to John Muscarella, manager of EDS' information processing services division.

The center "fits in with EDS' strategy of progressively turning into a broad-based, soup-to-nuts supplier of information processing, networking facilities management and systems integration," said Brian Jeffery, managing director for Los Altos, Calif.-based research firm International Technology Group.

The culmination of a four-year, $1 billion development effort, the center is responsible for 24-hour reliable operation of EDS' 21 information processing centers and its worldwide network, EDSnet.

ELISABETH HORWITT



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IBM signs onto CD-ROM team

BY PATRICK WAURZYNIAK
CW STAFF

ANAHEIM, Calif. — Compact disk/read-only memory (CD-ROM) applications developers may still be grappling with practical corporate implementations of the technology, but that did not deter IBM from joining Microsoft Corp. last week in a plan to develop a standard for multimedia personal computers.

At Microsoft's Fourth International Conference on CD-ROM here, IBM joined hands with both Microsoft and Intel Corp. to further the development of multimedia standards.

IBM and Microsoft are attempting to make CD-ROM/XA (Extended Architecture), which supports interleaved audio, an open industry standard for multimedia PC computing systems by incorporating it in Microsoft's Windows/386 and IBM's OS/2 Presentation Manager.

CD-ROM/XA is an enhancement to the original CD-ROM specification developed by Microsoft, Philips Telecommunications N. V. and Sony Corp.

In addition, IBM announced it had signed an agreement with Intel to develop Micro Channel Architecture board-level products to bring the multimedia format known as Digital Video Interactive (DVI), a technology Intel acquired last year from General Electric Co., to IBM's Personal System/2 line of personal computers.

Next generation

James A. Cannavino, IBM vice-president and president of IBM's Entry Systems Division, told more than 2,000 conference attendees that IBM considers multimedia technology, including Intel's DVI, as the next-generation way to integrate audio and video data with enhanced graphics on PCs.

"We're poised at the beginning of an era that will change the way people use personal computers," Cannavino said. "IBM's goal is to make tangible solutions for our customers, and multimedia offers so much potential for personal computers."

Meanwhile, a handful of firms continue making practical CD-ROM implementations such as Hewlett-Packard Co.'s Laserrom compact disk-based documentation service and Digital Equipment Corp.'s recent decision to put its VMS operating system manuals and documentation on compact disks.

In the field

Chicago-based accounting firm Arthur Andersen & Co. in Chicago recently completed distribution of 1,200 portable CD-ROM readers to its field auditors, who will use CD-ROM reference disks full of technical information on Securities and Exchange Commission regulations and the company's own proprietary procedures, guidelines and software applications.

Other companies with CD-ROM programs, such as Lotus Development Corp. in Cambridge, Mass., are investigating the practical uses of multimedia compact disk technology.

Lotus, which for two years has marketed its One Source family of CD-ROM financial and database products, last week demonstrated an internal multimedia application prototype that will be used to tout the firm's June introduction of 1-2-3 Release 3.0.

Want to sound off, ask a question or just chat with other IS professionals? The *Computerworld* bulletin board has been enhanced with an open forum for general discussion and E-mail to our staff and other registered bulletin board users. Call and fill out our on-line survey so we can add more features that interest you. Our modem number is 508-626-0165.

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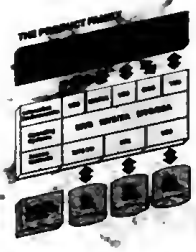
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EDITORIAL

Cut it out

A SOFTWARE INDUSTRY association musters righteous indignation over a loophole that allows state agencies to copy software without liability. Both Microsoft and Apple issue press releases announcing that they each won the first round of Apple's copyright-infringement suit. Ashton-Tate rattles its legal sabers at anyone who even considers cloning the Dbase language. Members of rival Unix camps snipe at each other, while AT&T's Robert Kavner has reportedly taken steps to personally prevent the groups from linking up.

Fade to black.

Same time, different scene: Motorola announces the 68040 processor. Intel prepares to unveil its next-generation 80486 just six weeks after introducing a RISC chip that crams a million circuits onto a sliver of silicon. Data General develops a 17-MIPS workstation for less than $8,000, eclipsing DEC's new price/performance standard after just six weeks.

Isn't something terribly wrong here?

Software development has lagged behind hardware engineering for a long time, but the gap is widening and the software industry looks less equipped than ever to do anything about it. The business is rife with delays, broken promises and litigation. Industry leaders who griped for two years that they desperately needed a follow-on to PC-DOS sit like bumps on a log as OS/2 passes its first birthday.

Instead, the software industry is captivated by the same things that occupied it three years ago: protecting copyrights, extending intellectual property laws, preventing users from copying software and squeezing a few extra bucks out of an upgrade. Periodically, industry leaders meet at conferences to clap each other on the back for knowing so well what their customers want.

This is not to trivialize the importance of intellectual property or licensing issues. But the contrast between the technology leaps made by hardware makers and the plodding progress of the software industry is too great to ignore. With the introduction of the 80486, Intel's PC hardware will be two full generations ahead of the most advanced operating system available for it. Unix remains mired in committee meetings and politicking, while RISC processors are making MIPS a disposable commodity. Software vendors desperate to keep their name before the public are resorting to "strategic alliances" and "joint development agreements" that promise vague products far down the road.

Meanwhile, buyers say they want new software, but what they really need is products that meet the specific needs of their business. There is a real market for manufacturing software incorporating real-time data collection, mainframe access and interactive graphics, but there's not much interest in another spreadsheet.

The hardware is there to make that kind of application a reality. Will the software industry stop fighting long enough to see it?



LETTERS TO THE EDITOR

Worm returns

Computer newspapers during the past few months have been publishing letters about two seemingly unrelated events. One concerns the Internet attack. The other is the perceived notion by some readers that acronyms are not defined often enough in articles.

An early morning revelation has shown me that there is, however, a connection. I offer the following two acronyms as proof that the two events are related.

Wipe
Out
Remaining
Memory
Systems

Valiantly
Infesting
Resources
Under
Seemingly
Excellent
Security

Lee Schultz
Assistant Director
Academic Computer Services
The College of Wooster
Wooster, Ohio

Not-so-new auditors

As an auditor for the past 15 years, the majority of them in data processing, I take exception with Les Gilliam's column, "The new EDP auditors" [CW, March 13]. I agree he brings up valid concerns, but these are issues that have been around for years and are of concern to management consultants, external auditors, internal auditors and so on.

He is surprised that IS departments continue to operate by the seat of their pants without standards. That would not surprise most EDP auditors, old or new. That is a department manager's prerogative, and successful departments are managed in many different ways — with or without management systems.

I don't think there are new EDP auditors, but there are new challenges to EDP auditors, including PC controls, local-area network/distributed processing and telecommunications issues. Communicating these technical control concerns to senior management is the new demand on all EDP auditors today. Next time, why not ask an auditor?

John F. Browne
Life Audit Manager
Chubb Insurance Co.
Concord, N.H.

No light snack

Regarding "No backup available if sharks get hungry" [CW, March 13], I work as a PC software and communications consultant, but I also have a fair background in marine biology. I recollect that sharks have a keen electromagnetic (E&M) sense, and as such they are extremely attracted to anything that emits E&M waves, such as underwater copper communications cables.

However, fiber-optic cables do not emit E&M waves, because they are laser light waveguides. The only places that could emit E&M waves are the repeaters and splicers; properly shielded, these would not emit them either and therefore would not attract sharks.

In other words, I see fiber-optic cables as much more resistant, if not totally immune, to sharks than their copper counterparts. The problem is that this information is not well-known in the business world. Most people think that glass fiber cables are just as attractive to curious and hungry sharks as copper cables are.

Daniel Lyons
PC Software Consultant
Boulder, Colo.

Bachman update

We would like to point out some information that was incorrect in your recent coverage of our new product [CW, March 13].

- The Bachman/DBA for IBM's DB2 is not an enhanced version of the Bachman/Data Analyst. It is a separate product. Release 2.1 includes an enhanced version of the Bachman/Data Analyst product, released in June 1988.
- Version 1.0 of the Bachman/Re-Engineering Product Set supported the building of IDMS database designs from scratch or through reengineering existing IDMS systems. It did not support these tasks for DB2. This capability was introduced in Version 2.1.
- Current products translate existing database designs into database-independent designs that can then be forward-engineered into IDMS as well as DB2 designs.

Arnold Kraft
President
Bachman Information Systems
Cambridge, Mass.

Computerworld welcomes comments from its readers. Letters may be edited for brevity and clarity and should be addressed to Bill Laberis, Editor, Computerworld, P.O. Box 9171, 375 Cochituate Road, Framingham, Mass. 01701.

Users prefer promises, not simply products

EFREM G. MALLACH



Products are what most vendors care about. But it's the promise of the products that users care about. Products are necessary, but not sufficient, for a promise to be realized.

Just as vendors need to recognize that they are purveyors of promise as well as product, so too must we in information systems. We are suppliers to the users in our organization. They are our customers, and they expect more than just raw product.

What's the difference between delivering a product and delivering its promise? We see it in any significant purchase we make in our personal lives — a Caribbean vacation, for example. The product I buy is carefully and legally defined by the tour operator: plane tickets, hotel room, meals.

The promise is quite different: warm weather, sandy beaches, reggae bands, no worries. If I get the product but not the promise, I'll be miffed. I may have no immediate recourse. Tour operations hire expensive lawyers to write ironclad contracts.

The problem may not be the tour operator's fault, but I'll still be miffed. I may never use that operator or visit that island again. And I'll tell all my friends not to.

The IS assumption

In an information systems shop, when we develop a prospective system for our sales department, we might think we contract to deliver working software. The program is defined by a specification or a prototype.

When we meet the terms of this contract, we've done our job. If we're really user-focused, we might extend our contract to include a user manual, training sessions and help lines. But they are still products, and users don't really want products.

What do they want? In this case, it's information about sales prospects. We may choose to deliver this data via a computer, but that's incidental. If users could get this information more quickly and easily by examining the entrails of a sacrificial goat, they would want goats. And it would be our job to deliver goats.

This recognition implies a new mind-set on the developers' part. It means sitting down with users to see how they really do their jobs, not just relying on a signed-off spec. It means thinking of software quality not in terms of bug frequency but in terms of meeting users' needs on the job.

It means checking with our users on an ongoing basis to see if the system is being used as intended and is performing to their satisfaction. It means not resting until they are satisfied. If we don't do all these things, we can't deliver the promise of the systems we develop.

Delivering the promise of a new system may mean going beyond technical issues. Effective use of a new system may require behavioral and cultural changes within the user organization. Developers who see their jobs as writing code to meet a spec will ignore this requirement or shrug it off as someone else's problem.

DEVELOPERS WHO want to deliver the promise must address the whole picture, including the behavioral issues.

Developers who want to deliver the promise must address the whole picture, including the behavioral issues. Perhaps it is not in their power to mandate the necessary changes. But it is within their power to discuss these needs thoughtfully with those who can bring them about and to develop a usable system for real people rather than a technological marvel that cannot succeed in any achievable organizational climate.

The difference between the two approaches is not expensive. The product — a working system — must be designed and delivered in any case. So must its training, documentation and support.

The need to make changes and the cost of making them cannot be avoided by waiting until the users insist on them; they can only be postponed. These items are the major expenses. The cost of communicating with users, of really listening to them, is negligible by comparision.

So the change is not in the budget but in the focus. Everyone from the most junior programmer to the head of MIS must see his or her job as meeting users' information needs — not writing a transaction validation module; not designing a database schema; not managing a

Continued on page 18

Mallach is a faculty member at the University of Lowell in Massachusetts and a consultant to users and vendors.

Nebulous system in the making

MICHAEL B. COHN



Something is up when the director of MIS wants to see a systems analyst at 4:30 p.m. on Friday. Either it's very good news or very bad news, and because my car had been sitting in Visitor Parking since lunch, I figured it was the latter.

The door was open, and she motioned me to sit down. "Weren't you a maintenance programmer on the billing system?" she asked, as she pulled a file folder from her desk.

"Yes, ma'am," I replied, "but that was several years ago." I knew it — one of their history tapes must have been on fire. Or someone dropped a disk pack. I grabbed the arms of the chair.

"Well, I promised the billing manager a while ago that we'd look into installing a new system," she said, paging through her desk calendar, "He'll be back from vacation on Monday, and we haven't done a thing. Could you do some research and get back to me?"

"What type of system are we talking about?" I inquired casually, relieved that my car had gone undetected.

"I have no idea," she replied, as her phone rang. "Just talk to a few of his people first thing next week. OK?"

I was a bit confused. But in case that phone call was about billing reports printing upside-down, I decided to make a hasty retreat out of her office and into the weekend.

To the source

First thing Monday, I lined up the manager and a few of his users on my calendar. I brushed up on my old billing notes, and on Tuesday, I started with Barbara, who had been a clerk there longer than anyone could remember, probably well into the 18th century.

Barbara's desk was smothered with piles of binders, folders and printouts. After I had waited for several minutes, she emerged from under one of the stacks. "I used to have an extra chair around here someplace," she said, but she obviously didn't anymore. I sat down on a column of what looked like reports from last year leaning next to her desk. "Pardon the mess," she apologized, "and I hope that's not the pile where I left that tuna sandwich." And I hoped it wasn't near the top.

"So Barbara," I asked, "what do you hear about this new billing system?"

She made a face as if I'd just asked her to take off her clothes. "What new system? Who said anything about a new system?"

Perhaps going to Barbara first wasn't such a hot idea. I took a softer approach. "Uh, they're probably just talking about some new system enhancements," I suggested. "Maybe you could just give me some idea what you do with the reports you're getting now?"

"I'm supposed to get all the error reports, ' she responded, with a heavy emphasis on the "supposed." "I'm supposed to put the dailies in the blue binders, the weeklies in the red binders and the monthlies in the green binders, but we're out of them, so I'm using extra blue binders."



SEATTA SIPURA

She unlocked the large drawer at the bottom of her desk and a flock of colored binders spewed forth.

"Who reads these reports?" I asked as she tried to close the drawer.

"Beats me," she said as she strained against the stubborn binders. "I keep this drawer locked most of the time, anyway."

"Well, why do you even get these reports, Barbara?" I innocently asked as she rammed one knee into the still-open drawer and ran her nylons in the process.

She was irritated. "Would you tell me how they'd get into the binders, then?"

It looked like she was backing up to get a running start at me. So I hastily thanked her and made a quick exit, heading for the billing supervisor's office.

This woman was expecting me and knew about the new system.

"We've been talking about it for some time," she said. "We think that you should use one of those databases like some of the other companies are using."

"Well, first things first," I said, opening my notebook again. "What kind of changes were you thinking about for the data entry screens?"

"Oh, don't change those. We want them to work just the way they work now," she replied. "We've invested a lot of training on data entry."

"No problem," I assured her, since I had designed most of those panels myself. "What type of features were you thinking about for on-line queries and reporting?"

"Oh, you need to make sure that we have all the same reports and features that we get from the current system," she said without hesitation. "We have to keep all of that stuff."

I scratched my head. "Well, I'm not sure I follow you. You want a new system with all the same inputs and outputs of the old system?"

She nodded.

"In that case," I wondered aloud, "why a new system? Were you looking for some type of connectivity? Or download/upload from PCs? Or modeling and analysis tools?"

"All that would be nice," she said, "and maybe one of those databases like the other companies are using."

On Friday, I was finally able to get in to see the billing manager. He still sported a nice vacation tan. He was eager to talk to me.

"I understand you've been talking about the new system with some of my people; that's just great," he said. "What kind of questions do you have?"

"Well, sir, I've heard a couple of different stories about the new system," I replied, as I opened up my notebook. "Could you give me some idea of the major features you're looking for?"

"I'm not quite sure what we want yet," he paused, leaning back in his chair. "Why don't you go back to your office and write up a schedule and do some Gantt charts. Maybe you could come up with the major dates, like for coding and testing, and an implementation date. Once I see that,

Continued on page 18

Cohn is a quality assurance representative based in Atlanta.

BOOKS IN BRIEF

Ideas and Information: Managing in a High-Tech World
By Arno Penzias
The Nobel laureate (Physics, 1978) from Bell Laboratories traces the evolution of computer technology, demystifying it along the way for those who fear its impact and showing how the mind and the machine can work together productively.

Hardcover, 224 pages, $17.95, ISBN 0-393-02649-3, by W. W. Norton & Co., New York.

The Pick Perspective
By Ian Jeffrey Sandler
A book that explores not only what Pick does and how — something novices to the operating system need to know — but also why the operating system acts the way it does, which is insight of interest even to old hands at Pick.

Hardcover, 290 pages, $34.95, ISBN 0-8306-3123-2, by Tab Books, Inc., Blue Ridge Summit, Pa.

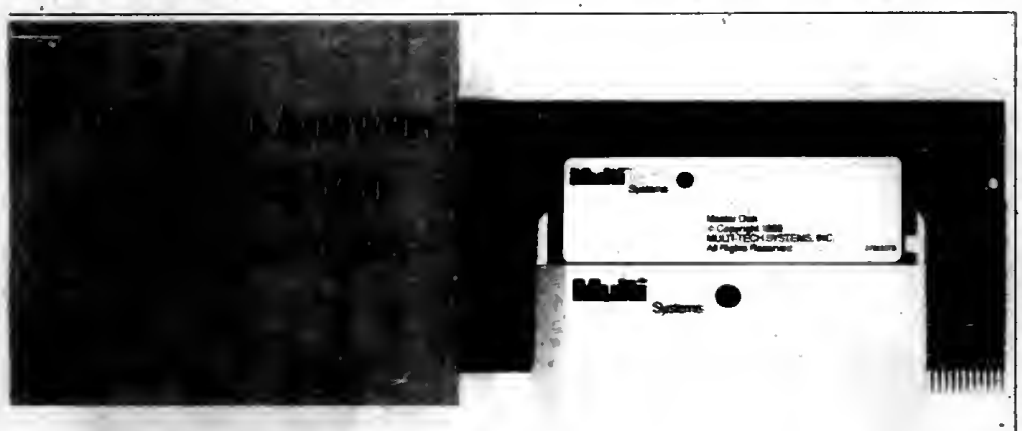
Measuring Business Value of Information Technologies
By Paul Strassmann, Paul Berger, Burton Swanson, Charles Kriebel and Robert Kauffman
Leading management strategists provide innovative approaches to answering a difficult question: What is the strategic value of information technology?

Hardcover, 173 pages, $34.50, ISBN 0-945098-02-2, by ICIT Press, International Center for Information Technologies, Washington, D.C.

On-Line Text Management
By P. C. McGrew and W. D. McDaniel
An examination of Hypertext and other techniques for creating, managing and using an online, mainframe-based text environment.

Hardcover, 242 pages, $39.95, ISBN 0-07-046263-1, by McGraw-Hill Publishing Co., New York.

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Cohn

FROM PAGE 17

I'll be able to better tell you what kind of system I want. How's that sound?" He placed a hand on my shoulder and walked me to the door.

I headed back to my cubicle with a very empty feeling. In transit, I passed the open door of the MIS director. She was on the phone but spotted me and waved me in. I wasn't making a lot of progress, but at least I was getting some great visibility. I opened up my notebook and waited until she hung up.

I was assertive. "Let me tell you where I stand on the new billing system," I offered.

"Maybe some other time," she said, as she looked out the window. "Right now, I want you to go move your car out of Visitor Parking."

Mallach

FROM PAGE 17

project. The job is to meet users' information needs. All else is a means to that end.

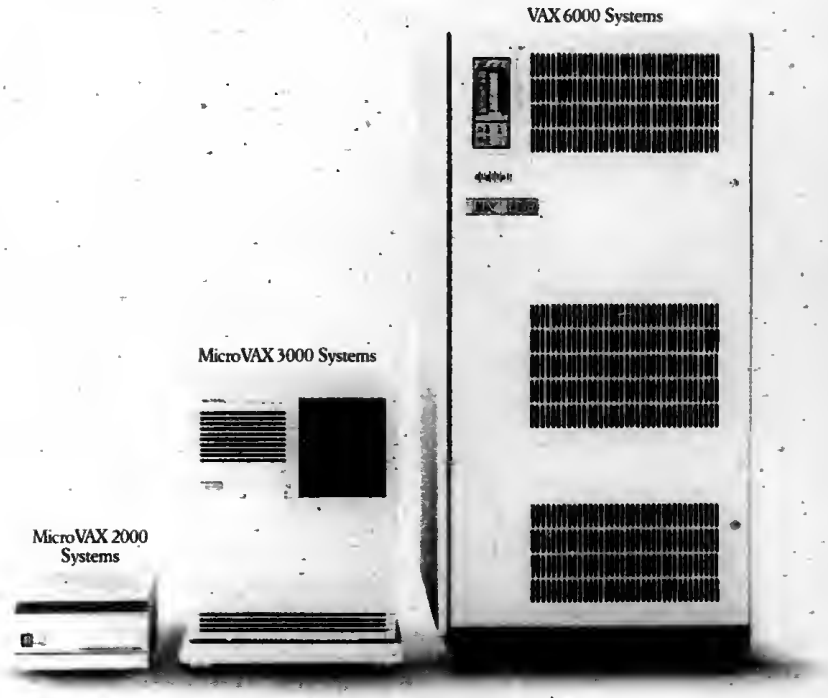
The danger of a product focus to a vendor is obvious — Chapter 11, in which the company can join dozens of other firms that thought technically excellent products were the whole story.

The danger to MIS managers is more subtle but no less real. Top executives don't appreciate spending money on systems that go unused. They don't appreciate hearing marketing directors and production vice-presidents complain about an IS group being off in its own little high-tech world. They don't want and don't care about systems. They want the promise of the systems — information that meets users' needs quickly, accurately and conveniently.

They will reward those who deliver the promise. The career equivalent of Chapter 11 awaits those who don't.

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INSIDE THE INDUSTRY

DCA: More Than Just Irma

...with new products and acquisitions

122 Computer Systems News

PRODUCTS

Monday, November 14, 1988

DCA Links Macintosh To Mainframe

New Software Dovetails With A... Computing Strategy

BY JOHN THOMPSON

ANAHEIM, CALIF. — Digital Communications Associates Inc. last week announced a software package for Apple Computer Inc. that links IBM mainframes to the Macintosh personal computer.

The software package could prove to be a key element in Apple's strategy...

PC W...

DCA To Bring Mac... Graphics to Mac

By Jean Morrissey

Digital Communications Associates Inc. intends to be the first off the block with software that gives Macintosh users the ability to display...

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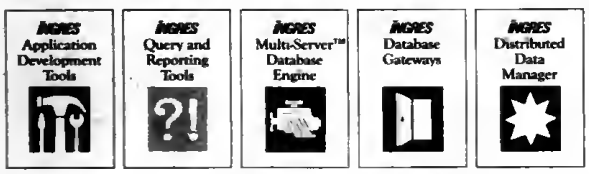
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CW

NEWS 50
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SOFT TALK

Howard Fosdick

SAA issues bubble up



IBM's Systems Application Architecture (SAA) promises transferability of knowledge across systems, a common user interface, transportability of code and a common programming interface. But while the architectural differences may be papered over for the user, a technical support person working with the various SAA databases will have to know how to deal with not only one relational database management system but four. Beyond the soothing SAA platitudes, there are real programming issues that will have to be addressed.

In most development projects, the underlying database determines compatibility across systems. Without compatible database managers, you just can't have application-level compatibility. Version 1.1 of the OS/2 Extended Edition Database Manager makes it possible to compare it with DB2, SQL/DS and SQL/400.

Overall, my conclusion is this: Database Manager SQL is the same as that in IBM's mainframe products, as far as end users and application program-

Continued on page 32

RDBMS a dead end?

Object-oriented tech boosters spark user debate

ANALYSIS

BY AMY CORTESE
CW STAFF

At a recent symposium, proponents of object-oriented technology assailed the relational model for data management, declaring, "Relational is a dead end."

However, users at the Fifth International Congress on CIM Databases dismissed academic arguments on the merits of object-oriented vs. relational technology, preferring instead to focus on relevant issues of implementation today.

"The real issue is trying to get data under control, whether object-oriented or flat-file," said Rick Hyman, staff engineer at conference participant Eastman Kodak Co. Computer-integrated manufacturing (CIM) is one area in which proponents of object-oriented programming expect great acceptance.

Many users expressed the view that whether or not object-oriented technology is the way of the future, relational systems are a reality today. "Relational is not something we will throw out," said Roger Burkhart, price analyst at Deere & Co.'s Deere Technology Services.

But observers said the emergence of object-oriented tech-

Continued on page 28

IBM, third-party storage price cuts regarded as lure

BY ROSEMARY HAMILTON
CW STAFF

IBM and third-party suppliers have been chopping prices on expanded storage for 3090 mainframes to lure users, many of whom reportedly are taking a slow man'a approach to expanded storage implementation.

EMC Corp. recently became the latest price slasher. The firm, which began volume shipments on 3090 expanded storage last month, will offer a $60,000 price break to users purchasing 64M-byte expanded storage modules by June 1. That will bring the price down to $97,500.

In February, IBM cut the price of its offering from $225,000 to $185,000 for a 64M-byte increment. It also announced a deal to give users an additional $50,000 off their purchase if it is made by June.

If only

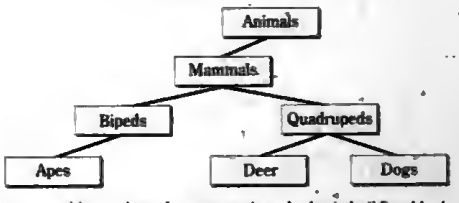
"If I had a choice, I wouldn't buy it," said John Wood, director of computer operations at the Royal Bank of Canada in Toronto, where 384M bytes of expanded storage has been installed on two 3090 Model 400Es. "We aren't EMC customers yet, but we're considering them for the price."

Expanded storage is a key component of IBM's Enterprise Systems Architecture (ESA) strategy and, as a result, is an important sell for IBM.

However, according to David Vellante, who is an analyst

Continued on page 28

Building blocks



In object-oriented programming, the basic building block is an object that combines data and functionality in a single entity. For instance, the object "animal" contains descriptive data about an animal as well as operations that it performs, such as eating and running, noted Dataquest, Inc. and Ontologic, Inc. in a joint report.

Objects are grouped into classes that share characteristics and behaviors. For example, four-legged mammals are grouped in the quadruped class. Classes are organized in a hierarchy from general to specific, with a class inheriting the behavior of the class it descends from. Dogs are quadrupeds, which share the characteristics of the larger class of mammals.

By isolating relevant information within the object, a method called encapsulation, the programmer is freed from details of implementation. This allows different objects to respond to the same generic commands in their own unique way, as defined by the instructions contained in the object. For instance, when asked to run, the quadrupeds would respond to that generic command differently than the bipeds. Moreover, a deer would respond slightly differently than a dog.

Object-oriented design allows reuse of code and simplifies changes. If a programmer wanted to add humans under bipeds, only information that humans do not share with the group "bipeds" would need to be coded.

AMY CORTESE

Inside

- Atlantic Casualty gains time. Page 25.
- Programming pioneer still on track. Page 25.
- Software AG unrolls Data Center Management series. Page 32.

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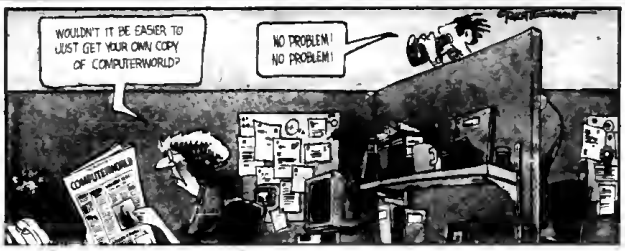
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   - 50 Business Service (except DP)
   - 60 Government — State/Federal/Local
   - 80 Communications Systems/Public Utilities/Transportation
   - 70 Mining/Construction/Petroleum/Refining/Agric.
   - 90 Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 95 Computer & DP Services, including Software/Service Bureau/Time Sharing/Consulting
   - 96 Computer Peripheral Dealer/Distributor/Retailer
   - 75 User: Other _____
   - 99 Vendor: Other _____ (Please specify)

2. **TITLE/FUNCTION** (Circle one)

   IS/MIS/DP MANAGEMENT
   - 10 Vice President/Asst. VP
   - 21 Dir. Mgt. Supv. IS/MIS/DP Services
   - 22 Dir. Mgt. Supv. of Operations, Planning, Adm. Services
   - 23 Dir. Mgt. Supv. Analyst of Systems
   - 31 Dir. Mgt. Supv. of Programming
   - 32 Programmer, Methods Analyst
   - 85 Dir. Mgt. Supv. OA/WP
   - 86 Data Comm. Network/Systems Mgr.

   OTHER COMPANY MANAGEMENT
   - 11 President, Owner/Partner, General Mgt.
   - 12 Vice President/Asst. VP
   - 13 Treasurer, Controller, Financial Officer
   - 41 Engineering, Scientific, R&D, Tech. Mgt.
   - 51 Sales/Mktg. Mgt.

   OTHER PROFESSIONALS
   - 90 Consulting Mgr.
   - 70 Medical, Legal, Accounting Mgr.
   - 80 Educators, Journalists, Librarians, Students
   - 00 Others _____ (Please specify)

3. **COMPUTER INVOLVEMENT** (Circle all that apply) Types of equipment with which you are personally involved either as a user, vendor or consultant
   - A Mainframes/Supermins
   - B Minicomputers/Small Business Computers
   - C Microcomputers/Desktops
   - D Communications Systems
   - E Office Automation Systems
   - F No Computer Involvement

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Tandem goes to Relational DBMS tools

BY J. A. SAVAGE
CW STAFF

CUPERTINO, Calif. — Betting that Relational Technology, Inc.'s SQL database tools will ease application development and access to systems based on open standards, Tandem Computers, Inc. recently agreed to co-develop a product to run on its Nonstop SQL relational database management software.

"It might help us in the future," said Tony Rigney, systems analyst at the Eugene, Ore.-based retailer Emporium, Inc. Rigney said he expects to improve ease of use by using SQL on his three-CPU Tandem TXP in the next couple of years.

"It should improve the overall usability of Tandem products," said Peter Kastner, vice-president of Boston-based consultant The Aberdeen Group, Inc. He said the move is another great stride in reducing the visibility of Tandem's proprietary operating system.

Products are expected to be available in the first quarter of next year at prices comparable to those of current Relational products.

The agreement does not preclude either side from making similar agreements with other vendors. Relational, according to Robert Healy, the company's vice-president of marketing, made similar agreements with Digital Equipment Corp. and Data General Corp.

Playing with the speed of MIPS

Insurance firm saves time and money after installing DG MV/40000

ON SITE

BY JAMES DALY
CW STAFF

GOLDSBORO, N.C. — Forty-five seconds may seem a mere dust speck in the eyes of Father Time. Scientists say the Earth just passed its 20 millionth birthday; heck, there's even a gnarled bristlecone pine tree that has staked out its turf in the California mountains for more than 46 centuries.

But if you're a foot-tapping MIS manager helplessly watching 75 programmers wait the better part of a minute for a seriously overworked system to respond to a command, 45 seconds can seem like an afternoon slogging through wet concrete.

That's just the situation in which the staff at Atlantic Casualty and Insurance Co. found themselves recently. And it was driving Senior Vice-President Ed Steed crazy.

"Something had to be done," Steed said, a tinge of desperation still coloring his voice. "Not only were we getting many delays, but we had gotten to the point where we had to schedule any processing because it would degrade the systems so badly."

By late last year, the problems with Atlantic Casualty's 4-year-old Data General Corp. MV/10000 had become chronic: Some reports were taking up to 10 hours to run.

Such computational foot-dragging was not only frustrating, it was hurting business. Atlantic Casualty is a 6-year-old company specializing in what it calls nonstandard automobile insurance. The typical insurance company may balk at issuing insurance coverage to a driver in the Indy 500. Instead, the would-be Mario Andretti calls someone like Atlantic Casualty.

If the system is gummed up, it hobbles the firm's ability to process the flood of policies coming in every day. But last October, DG announced its high-end MV/40000, and it seemed to be just the tonic for Atlantic Casualty. Although the all-DG shop had kicked around the idea of upgrading to the MV/20000, it was thought that the computational needs of the rapidly expanding company would soon exhaust even that machine.



HAL MAYPORTH

So in early January, Atlantic Casualty became one of the first companies to take delivery of an MV/40000. Using the MV/10000 to obtain a $150,000 trade-in credit, the firm obtained the MV/40000 for approximately $500,000.

After three weeks of being poked, prodded and put through the paces, the new system went on-line. The difference between the MV/10000, which is said to process 2.5 million instructions per second (MIPS), and the 14-MIPS MV/40000 was dramatic. The familiar delays evaporated. Response time was down to less than four seconds, and reports that at one time required an entire shift to run were processed in less than an hour, Steed said.

"The thing that is most noticeable is the I/O; it's about four times what it was with the 10000," Steed added.

Since the machine handles the entire claims-processing procedure, everyone in the company began to breathe easier. "It got so I could go up and get a cup of coffee while compiling," said senior programmer Larry Saulmon. "Now it's always waiting on me."

The MV/40000 also allowed for a more efficient distribution of personnel. "We cut three people from one department and put them in another department," Steed said. "So it's a real money saver."

Another added bonus was that the new system takes up less space in the data center, giving MIS staffers more elbow room.

Steed said he expects the newcomer to satisfy Atlantic Casualty's computational needs "for the next decade, at least" because of its added capabilities and room for growth. As many as four processors can be added to the MV/40000, giving the firm's uniprocessor version the potential to handle up to 50 MIPS.

Further investigation

Steed added that he will give DG's new Aviion line of workstations a hard look when they arrive this summer and said there is a good possibility that several of those machines — which can process up to 17 MIPS — will be tied into the MV/40000 network.

Data General has also added a number of features that will make the MV/40000 beneficial in high-volume commercial settings. These include an upgraded version of their AOS/VS operating system, a high-speed channel system and a separate diagnostic processor.

In addition, Steed received a touch of extra security. DG has thrown in a seven-day, 24-hour maintenance plan for the MV/40000, which covers all operating software and processors for one year.

Pioneer still blazing linear program trail

BY MITCH BETTS
CW STAFF

WASHINGTON, D.C. — Today's business executives may not be aware of it, but the computer models they use for complex planning decisions can be traced back to the 1947 invention of linear programming by mathematician George B. Dantzig.

Dantzig, 74, was honored last month with the 1989 Coors American Ingenuity Award for his invention, which was one of the first business applications devised for the computer.

In essence, linear programming is a decision-support tool that is ideal for resource allocation, Dantzig explained in an interview here. Oil companies, for example, have used linear programming to schedule tanker fleets, blend gasoline, design port facilities and create financial models.

Linear programming produces a computer model that takes into account all the variables of a manufacturing, scheduling or planning problem and sorts the possible scenarios to identify the most efficient solution.

On to the next generation

Dantzig, professor of operations research and computer science at Stanford University, and his students are now working on the next generation of linear programming: combining it with parallel processing computers to evaluate even more variables.

For the Electric Power Research Institute in Palo Alto, Calif., Dantzig's team is developing a computer model of the West Coast's utility systems to help them exchange electricity and thus alleviate temporary shortages.

"That's an example of planning under uncertainty, because you don't know how many generators are going to go down, you don't know how many transmission lines are going to fail, and you don't know whether demand is going to go up or down," Dantzig explained.

"There are literally millions of things that can happen," so the possible scenarios are simulated and then sampled by parallel processors. "You can have as many processors as you want doing the sampling all at the same time, so it's one of the most natural applications of parallel processing," Dantzig said.

The researcher also sees a good fit between linear programming and artificial intelligence. Combining a rules-based expert system with linear programming would be especially useful when the expert system comes up with numerous options that must be evaluated. The combination would yield a truly intelligent expert system, according to Dantzig.



Stanford's Dantzig

The Coors American Ingenuity Award, sponsored by Adolph Coors Co., previously went to Jack Kilby, creator of the first silicon computer chip, and John Atanasoff, regarded by many as the inventor of the digital electronic computer.

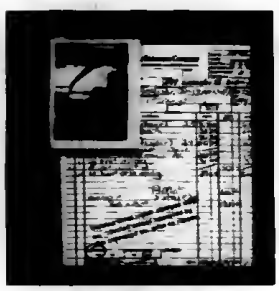
Dantzig came up with his idea for an operations-planning model after World War II, when he worked for the U.S. Department of Defense. The Defense Department wanted to automate its deployment and manpower planning.

In the early 1950s, with the advent of computers, the petroleum industry latched onto Dantzig's invention. "They started out with the simple problem of how to blend the gasoline for the right flash point, the right viscosity and the right octane and try to do it in the cheapest way possible. So that was a natural application," he said.

Linear programming was also a key development in the field of operations research, which deals with the application of scientific methods to decision making, especially resource allocation.



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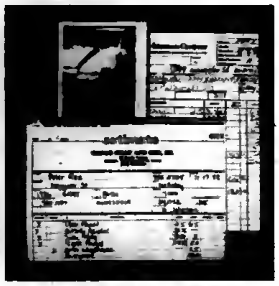
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Storage cuts

CONTINUED FROM PAGE 23

at market research firm International Data Corp. in Framingham, Mass., customers have not flocked to expanded storage as IBM had hoped.

"The real demand for expanded storage hasn't hit yet and won't until ESA is fully operational. So IBM had to make a move in the interim," he said, in reference to the price cuts. "They had to make it more palatable for users."

Vellante said approximately 50% of large IBM shops had not purchased any expanded storage by late last year.

EMC officials also attributed the IBM price cuts to slow-moving users. "They basically gave away ESA at first, but from a hardware point of view, people weren't moving quickly to ESA," said Brian Fitzgerald, an EMC spokesman.

Two other 3090 users contacted said they have not made any expanded storage purchases yet and would consider vendors other than IBM if those vendors proved to be reliable and could offer a lower price.

Louis Mickler, data center manager at Pacific Telecomm, Inc. in Vancouver, Wash., said he found the pricing of expanded storage very high, but he intends to purchase it once he moves to ESA. At that time, he said, he will shop for the best price he can find. "I'm not saying we'll choose someone else, but we will look at other vendors' options," he said.

RDBMS

CONTINUED FROM PAGE 23

niques today is analogous to the advent of relational database technology 15 years ago. At first, supporters of the incumbent network model rejected the new relational model. As it became apparent that relational would catch on, however, some vendors started implementing and most started claiming relational features.

While object-oriented programming has the potential to revolutionize the way software is developed, it is in danger of becoming a term that vendors will tack on to breathe new life into tired products.

Object-oriented design tears down the traditional tenets of structured programming and examines the problem of programming with a fresh perspective — one that more closely models the way things are in real life, its advocates say. This type of programming has been around for a decade and has paved the way for the new generation of graphical user interfaces ushered in by Apple Computer, Inc.

When applied to database management systems, object-oriented programming promises advantages over traditional methods of data management, resulting in applications that are easier to develop and maintain, according to proponents. Moreover, object-oriented database systems can incorporate relational concepts — a relation being just another object type.

Object-oriented DBMSs are particularly well suited for applications with many complex data types. So it is not surprising that the initial adoption of the technology has largely been complex engineering design and manufacturing applications.

Dataquest, Inc., a San Jose, Calif.-based market research firm, predicted that object-oriented database design will first be applied to computer-aided design, computer-aided software engineering and CIM applications and will dominate those segments by the mid-1990s.

A can-do system

David Pendleton, manager of the artificial intelligence program at the U.S. Department of Commerce's National Charting Research and Development Laboratory, contended that an object-orier.'ed database can do anything a relational DBMS can, but essentially, the two are tools for slightly different problems.

"Object-oriented [technology] is good for highly complex applications with diverse and complex data types, while relational is suited for business-processing applications with a restricted number of data types," Pendleton said.

The lab has been using Servio Logic Corp.'s Gemstone object-oriented database for two years as one of the firm's beta customers.

Pendleton employs object-oriented programming along with AI techniques to partly automate the creation of navigational charts, which are produced by the department and used to guide the country's aircraft and ships. This task currently requires hundreds of cartographers to draw maps by hand.

Discrete technology

Pendleton said object-oriented technology, as a software engineering technique, is useful for incorporating AI and rule-based systems. It is also natural for thinking of a problem in its discrete components and modeling that on the computer, he said.

Pendleton explained that while an entire chart is an object, it can be broken down into subobjects such as land areas and water and even further into shipwrecks, piers and other hazards of navigation. By sending a message to these objects, they can "draw themselves" to provide a first-cut chart for the cartographer, he said.

In this application, a shipwreck is an object, which could not be represented in the same way by character-based data types, Pendleton noted. The expert system comes in to play when the objects "decide" how best to portray themselves based on the situation.

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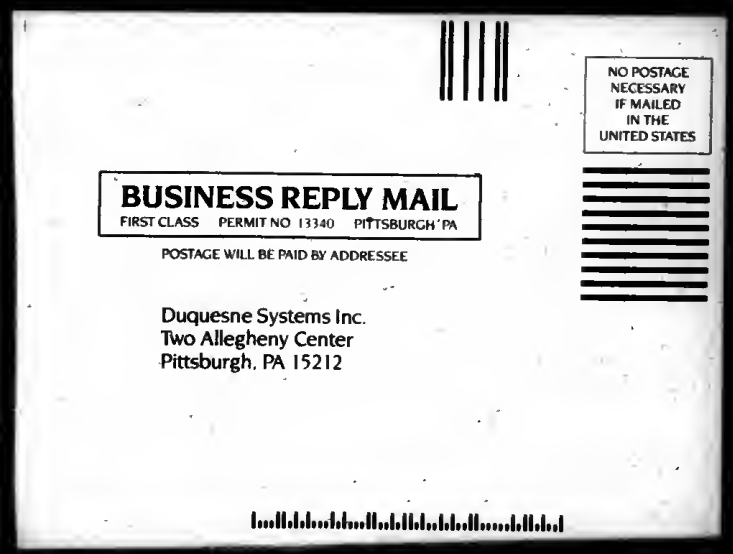
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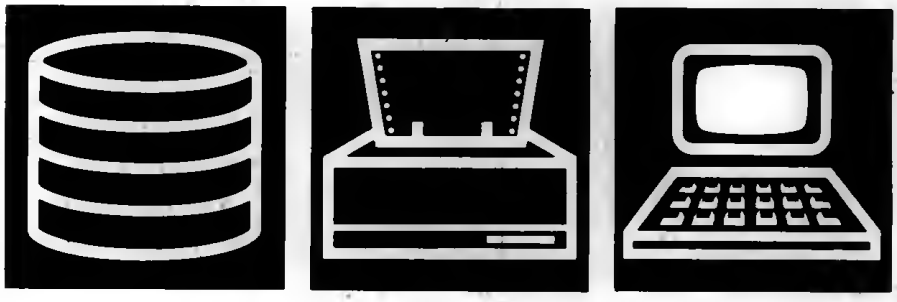
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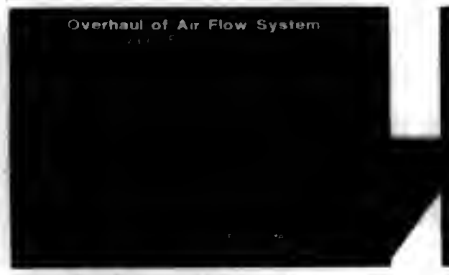
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Fosdick

CONTINUED FROM PAGE 23

mers are concerned. This provides the benefit of knowledge transfer. But when you analyze the tasks of database administrators and systems programmers, Database Manager SQL has little in common with its larger relations. The systems support staff gains little from SAA.

Let's compare the SQL languages. The Data Manipulation Language is identical between the OS/2 Database Manager, DB2 and SQL/DS. The Data Definition Language (DDL) diverges. The DDL that defines logical objects (tables, views, indexes) is the same. But the DDL for physical objects is totally different. The OS/2 Database Manager isolates the user from physical storage in the manner of other personal computer-based products.

However, there are similarities: Application programming with the OS/2 Database Manager is the same as with the other database products. Just as important, the Database Manager has the same transactional control facilities as do its mainframe counterparts.

Many MIS evaluators are stunned when they grasp the fact that the OS/2 Database Manager supports transactional programming. But they shouldn't be, since all the database products must have transactional capability for IBM to be able to follow through on its promise of a distributed database.

However, about the kindest thing one can say about the Database Manager catalog is that it is no more different from that of DB2 than is the SQL/DS catalog. While DB2 has about 30 catalog tables, SQL/DS has roughly 15 and the Database Manager nine.

Only seven or eight of the catalog tables directly correspond among the three products, and even then column names differ. Given the central role of the catalog, these differences constitute an incompatibility between DBMSs that IBM will likely never resolve.

Database utilities also fail the SAA test. DB2 has its utilities, "service aids" and the underlying OS and VSAM utilities. SQL/DS has its DBSU utilities, supported by CMS commands and other VM utilities in a VM environment. The OS/2 Database Manager offers easy-to-use utilities called Query Manager Tools.

The OS/2 Database Manager contains utilities that support the same functionality as their mainframe counterparts, but the exact manner in which the utilities are invoked and executed and their precise effects varies. These differences mean that SAA does not support transportability of utilities jobs.

The OS/2 Database Manager also differs from the mainframe DBMSs in that it includes a built-in applications generator called the Customized Interface.

This fourth-generation language is similar in concept to IBM's Cross Systems Product (CSP): You define an application by defining a series of objects. However, the actual use of the Customized Interface shows little similarity to CSP.

The last critical area to mention is that of the user interface. DB2 and SQL/DS offer QMF, the Query Management Facility. The Database Manager uses something called the Query Manager, which contains a prompted interface. QMF and the Query Manager are alike in concept but totally different in implementation. IBM is moving the Database Manager's Query Manager to the mainframe products to enhance compatibility. DB2 Version 2 Release 2 includes the Query Manager.

My bottom line is that IBM's database products, the OS/2 Database Manager, DB2, SQL/DS and SQL/400 are, indeed, a family of kindred products. However, they are not the same product. Nor will they ever be.

Fosdick is president of the Midwest DB2 Users Group and has written *Using IBM's ISPF Dialog Manager* and *VM/CMS Handbook*.

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Software AG introduces data center series

Software AG of North America, Inc. has entered the data center automation software market with the announcement of the Data Center Management series.

First in the series is Natural Operations, a fourth-generation language-based scheduling system said to automatically manage and control all Data Center on-line and batch production, job flow and resources. Features include a report facility, automatic archival and on-line retrieval of job control language system messages and reports and the ability to customize menus and functions.

According to Software AG, the next two offerings in the product family will be an integrated structured programming facility and an automated operator console that will reportedly enable data centers to operate on a lights-out basis. Both products are scheduled for release later this year.

Natural Operations is available for IBM MVS and MVS/XA operations systems, supporting JES 2 and JES 3, and is priced from $70,000. The product also runs with Software AG's Complete, as well as IBM's CICS, IMS/DC, TSO and VM/CMS teleprocessing systems.

MICRO BITS

Douglas Barney

Vanity in the air



No surprise here. Every year, industry maven Esther Dyson invites the richest and brightest stars of the personal computer industry to a remote location for several days of sunshine, deal-making and general bantering.

Panel discussions among high-profile vendor-types consume a good deal of the time, and this year, they were well-attended despite the glorious Palm Springs, Calif., weather and raucous college spring break festivities.

Maybe it was because I was inside smelling smoke and bodies instead of clean desert air, or maybe it was the tone of the panels. In either case, I was ticked off.

After hours of pap about marketing, future technology, lawsuits and distribution that were spiced with a litany of barbs, a lone MISer also had had enough. He stood up, not to ask a question but to make a point forgotten in the lust for profit. "You guys don't understand the first thing about DP," the user said, bringing a smile to the face of this MIS-bigoted reporter.

Continued on page 38

Groupware ties it all together

Common need challenges IS managers to design supporting architectures

BY MICHAEL ALEXANDER
CW STAFF

The problem with stand-alone personal computers is that they do not work like people work — in constant communication with each other. That is at least one reason why many companies are hurrying to put end users on local-area networks and organizing individual end users into cohesive work groups.

With groupware — software designed to support cooperative efforts on PC networks — end users can hold computer conferences, manage projects, create documents, design products, decide when the best time to hold meetings would be and even collectively brainstorm on creative endeavors.

"It's a change in the work environment that is so intoxicating, and [end users] are beginning to rely on it so much that they suffer withdrawal when they no longer have it," said George Gayle, PC LAN manager at Texas Commerce Bank in Houston.

Higgins to the rescue

The bank has been running Higgins, a groupware product marketed by San Leandro, Calif.-based Conetic Systems, Inc., for about a year on three networks consisting of 150 users.

"It has enhanced the communication capabilities of users on the network," Gayle said. "An individual can check the availability of a conference room, check the available time slots and schedule a tentative meeting in only a few minutes. It saves a lot of phone calls and cuts down on the false starts."

The group productivity package has electronic mail, calendaring, an appointment scheduler, a project management and telephone directory and other features.

"Higgins has a fax machine feature that allows you to set up a list to send memos by fax machine to people in the field externally and via E-mail internally," Gayle said. "Try that outside of a system like this."

At Ryder System, Inc. in Miami, four work groups on LANs are using IBM's Professional Office System electronic mail system to exchange information and files and for calendaring. One of the work groups in the data center compiles and updates electronic work sheets, detailing such information as the number of calls to the company's Help desks, manpower requirements, potential bottlenecks and information related to key projects that are in the works.

"LANs are definitely changing the group dynamics," said Pat Berastegui, senior office automation analyst at Ryder.

The changing dynamics also pose new challenges for information systems managers, however. With more of their end users on networks, IS managers must contend with designing and building network architectures that can support work groups of different sizes and with diverse objectives.

MIS will also cope with determining who owns and controls the data, meeting the increased demands of training users to properly use networks and evaluating software that was designed to support cooperative work, according to researchers.

Ideally, groupware should be designed to match the stability

Continued on page 38

Baxter gets PC smart, ousts dumb terminals

BY ELLIS BOOKER
CW STAFF

DEERFIELD, Ill. — Baxter Healthcare Corp. is filling a new prescription for the terminals used by its hospital customers. The medical products supplier based here is working out the details of a plan to replace the 3,000 teletypewriter terminals on its nationwide Analytic Systems Automated Purchasing (ASAP) order-entry system with MS-DOS-based personal computers.

"We want to support our customers and give them added functionality. This becomes increasingly difficult to do with nonintelligent terminals," said Ergin Uskup, vice-president of business technology at Baxter.

Among other uses, the PCs could enable customized order-entry menus or powerful cross-reference capabilities for the 120,000 health care products and services contained in the ASAP database, Uskup said.

Decision pending

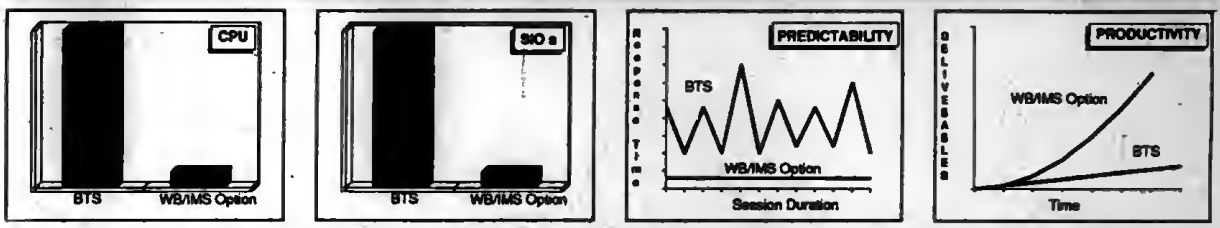
Although Baxter has not yet decided on a particular brand of PCs to replace the dumb terminals, it hopes to start the conversion this year and complete the project in 1990. Uskup said Baxter may provide two or three types of PCs to hospitals, depending on the application.

Baxter already has some experience with PCs on ASAP. Last August, it began beta-testing ASAP Express, a PC-based applications and communications package. Implemented on Intel Corp. 80286-based PCs, ASAP Express is now operational in 400 locations and will be released nationally July 1, according to Baxter.

The old ASAP system — developed in the 1970s and often cited as a prime example of the strategic use of information technology — was the innovation of American Hospital Supply Corp., which merged with Baxter in late 1985.

Baxter, with $7 billion in annual revenue last year, dominates the health care supply market and said its terminals can be found in 60% of the 6,000 to 7,000 hospitals in the U.S.

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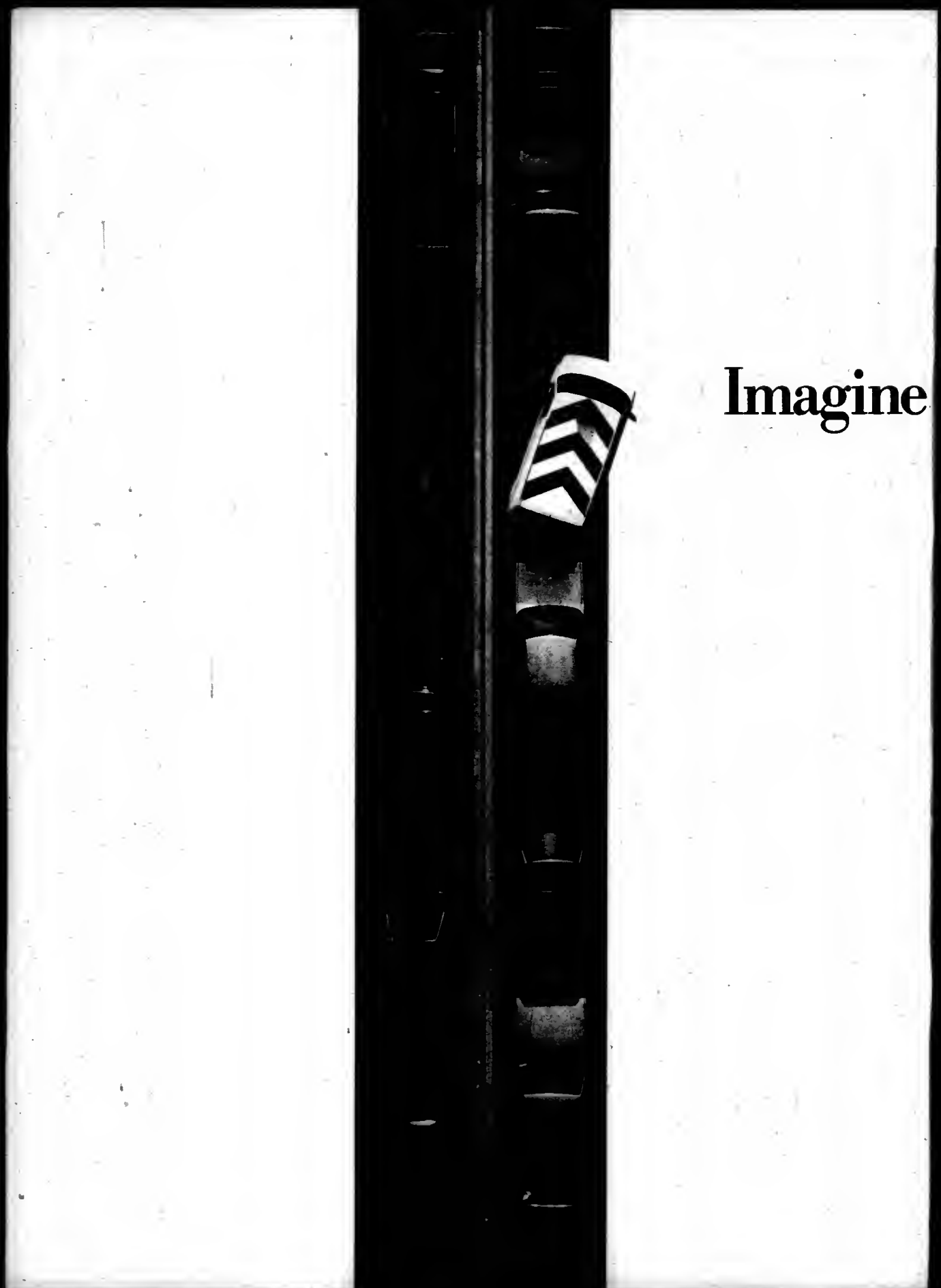
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A Comparison Chart of the Major Cooperative Processing Software Products:

Functions:	SUPER-LINK® Family	Enter/3270®	IBM's HILAPI™	IBM's APPC™ or CPI-C™	SQL*Star®	Arbiter®	Automator™
Cooperative Processing Topologies Supported							
Server/Requester	YES	NO	NO	NO	NO	NO	NO
PC-based Front-end To Existing Programs	YES	YES	YES	NO	NO	NO	YES
SAA/CUA Front-end Created Without Host Code Changes	YES	NO	YES	NO	NO	NO	NO
Peer-To-Peer Communications	YES	NO	NO	YES	NO	YES	NO
Distributed Database	NO	NO	NO	NO	YES	NO	NO
PC Developer's Toolkit							
4GL Language	YES	YES	NO	NO	YES	NO	NO
DBMS	YES	NO	NO	NO	YES	NO	NO
Screen Capture Facility	YES	YES	NO	NO	NO	NO	NO
Forms Generator / Screen Painter	YES	NO	NO	NO	YES	NO	NO
Can Call 3GL Subroutines	YES	YES	NO	NO	YES	NO	NO
Scripting Facility	YES	Partial	NO	NO	NO	NO	YES
Virtual Operator Mode	YES	YES	NO	NO	NO	NO	NO
Local Mainframe Communications Simulator	YES	NO	NO	NO	NO	NO	NO
Debugger	YES	NO	NO	NO	YES	NO	NO
Form Testing & Debugging System	YES	YES	NO	NO	YES	NO	NO
Host-based Transaction Simulator	YES	NO	NO	NO	NO	NO	NO
Automatic COPY LIB Generation	YES	NO	NO	NO	NO	NO	NO
Micro-based Table Generation Utility	YES	NO	NO	NO	YES	NO	NO
Automatic Generation of PC-level Documentation	YES	NO	NO	NO	NO	NO	NO
File Transfer Support							
ASCII/EBCDIC Conversion Of Data	YES	NO	NO	YES	NO	YES	NO
Transfer Of Binary Files & Text Files	YES	NO	NO	NO	NO	YES	NO
Transfer Under Host Or PC Program Control	YES	NO	NO	YES	NO	YES	NO
Full SDLC Error Detection/Correction For Async Links	YES	NO	NO	NO	NO	YES	NO
Front-End Processing Support							
SAA / CUA Fully Supported	YES	NO	NO	NO	NO	NO	NO
Optional Host Screen Pass Through	YES	YES	NO	NO	NO	NO	YES
Dynamic Control of Field Attributes	YES	YES	NO	NO	NO	NO	YES
PC FORMS of Up To Four Pages	YES	NO	NO	NO	NO	NO	NO
Field-level, Context-sensitive Help Facilities	YES	NO	NO	NO	NO	NO	NO
Automatically Non-Intrusive Help	YES	NO	NO	NO	NO	NO	NO
Optional Learning Mode Automatically Displays Help	YES	NO	NO	NO	NO	NO	NO
Icon-based Menus	YES	NO	NO	NO	NO	NO	NO
Light-bar Menu Selection	YES	YES	NO	NO	NO	NO	NO
Dynamic & Programmatic Cursor Control	YES	YES	NO	NO	NO	NO	NO
Softkey Labels	YES	NO	NO	NO	NO	NO	NO
Text Windows	YES	NO	NO	NO	NO	NO	NO
Peer-to-Peer Processing Support							
Data Compression	YES	NO	NO	NO	NO	YES	NO
Call-level interface between host and PC programs	YES	NO	NO	NO	NO	NO	NO
All Host Databases Supported	YES	NO	NO	YES	NO	YES	NO
All Host Applications Supported	YES	NO	NO	NO	NO	NO	NO
PC Developer's Toolkit Included	YES	NO	NO	NO	YES	NO	NO
Software Distribution Support							
Programmatic Interface	YES	NO	NO	NO	NO	NO	NO
Time/Date or Checksum Host Query	YES	NO	NO	NO	NO	NO	NO
Background Communications Support							
Simultaneous Background/Foreground Processing	YES	NO	NO	NO	NO	NO	NO
Control of Communications From Foreground Program	YES	NO	NO	NO	NO	NO	NO
Communications Protocols Supported							
LU2 Support	YES	YES	YES	NO	YES	YES	NO
LU6.2 Support	Planned	Planned	NO	YES	Planned	YES	NO
Application Portability							
Front-End Processing to Peer-To-Peer	YES	NO	NO	NO	NO	NO	NO
DOS To OS/2	Planned	Planned	Planned	NO	YES	Planned	Planned
LU2 To LU6.2	Planned	Planned	NO	NO	Planned	YES	NO
Host Environments Supported							
IBM TP Monitors Supported							
CICS	YES	NO	NO	YES	YES	YES	NO
IDMS/DC	YES	NO	NO	NO	NO	NO	NO
IBM Interactive Systems Supported							
VM/CMS	YES	NO	NO	NO	YES	NO	NO
MVS/TSO	YES	NO	NO	NO	YES	NO	NO
DEC VAX Supported	YES	NO	NO	NO	YES	NO	NO
Minimum PC Hardware Requirements							
IBM XT or Equivalent With 640k	YES	YES	YES	YES	NO	YES	YES

Every effort to present an accurate chart has been made; however no guarantee can be made. Enter/3270® is a registered trademark of Aspen Research. Automator™ is a trademark of Direct Technology. Arbiter® is a registered trademark of Tangram Systems. SQL*Star® is a registered trademark of Oracle Corporation.

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SMALL TALK

Michael Alexander

LANs and white collars a good mix



Corporate America is snapping up LAN servers, gateways, software and other local-area network products faster than an arcade video game swallows quarters, according to market researchers. A recent study by Business Communications Co., a Norwalk, Conn., research firm, indicates that annual sales of all LAN products will grow from some $2.7 billion in 1988 to more than $10 billion in 1996.

The combination of improved LAN technology and falling costs is certainly responsible for LAN popularity. But the sales rush may have more to do with corporate America's desire to boost white-collar productivity than with favorable price/performance ratios. The fact is, the nation's white-collar workers have not been as productive as blue-collar workers even though companies have spent tens of billions of dollars on information systems, ostensibly to boost productivity.

In a bid to hike productivity and competitiveness, many U.S. companies have been thinning their ranks of middle managers. Some researchers calculate that organizations have pared more than one million managers in the past 10 years. At the same time, U.S. companies are increasing middle managers' span of control, giving them more employees to supervise

Continued on page 42

Wingz gets its crack at dethroning Excel

ANALYSIS

BY JULIE PITTA
CW STAFF

The first shipments of Informix Software, Inc.'s spreadsheet Wingz have just reached Apple Computer, Inc. Macintosh users, who eagerly await its razzle-dazzle capabilities. But attractive features such as three-dimensional graphics may not be enough to challenge the installed base of Microsoft Corp.'s Excel, the leader in the Mac spreadsheet market.

"Wingz is an impressive package," said Jack Baumann, manager of end-user computing services at Hughes Aircraft Co., which has standardized on Excel. "But once you have an installed base of software, it's hard to switch to something else."

Before the Macintosh could be taken seriously by corporate users, upstart Apple had to woo software developers to create business applications for it. Because it was the first to create a spreadsheet for the Mac, Microsoft has established what appears to be an unconquerable lead, particularly with Excel's installed base in major companies.

Today, others have followed suit. Users say Mac spreadsheet packages offer features comparable to those for MS-DOS-based PCs.

"The spreadsheets on the Mac side and the DOS side are pretty equal now in terms of what they do," said Bo Pitzker, systems analyst at Pacific Bell Directory's information services group in San Francisco. "However, there are more specialized spreadsheets available on DOS that you can't get on the Mac."

Excel for the Mac boasts an almost 80% share in a market in which 142,000 spreadsheets were sold for the Mac in 1988, according to Infocorp, a Cupertino, Calif., research firm. A distant second is Multiplan, also a Microsoft product. Ashton-Tate Co. is also in the market with its Full Impact.

"It's nice to have a single product that works in both the MS-DOS and Mac environments," Baumann said. Excel is available in both a Mac and an MS-DOS version.

Excel is also the standard spreadsheet at Seafirst Corp., the Seattle subsidiary of Bankamerica Corp. "We've looked at the other packages, but I don't think we'll actively entertain the idea of switching from Excel," said Jim Hayes, a PC support specialist at Seafirst. "It seems to suit most people's needs."

Not all are pleased

Not all Excel users are as pleased. Pitzker said Excel's peculiarity of using the first megabyte of the Mac's memory has created problems for some users. For example, users must access Excel before moving into Multifinder, the multitasking version of the Mac's operating system, or else memory glitches occur, be maintained.

"We have people here building some pretty robust spreadsheets," Pitzker said. "If Microsoft doesn't alter this, there might be some defections."

Wingz, which began shipping in February after a delay of several months, has even impressed users committed to Excel. What they like is the product's ability to build spreadsheets and then create a polished presentation interspersing graphics and text. Also, Wingz allows users to create three-dimensional graphics.

"Wingz is a different kind of animal," Hayes said. "The output is a lot nicer than Excel's." Excel users must cut and paste text and graphics to generate the kind of presentations created by Wingz. It usually requires using a presentation package in addition to Excel.

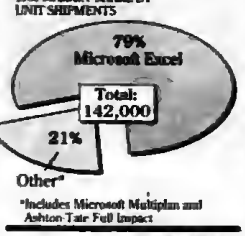
The drawback is that Wingz requires a significant amount of memory. "It requires 1M byte of RAM, but it runs better with 2M bytes," Hayes noted.

Ashton-Tate's Full Impact appears to have gained little ground against Excel since its introduction last year. According to Infocorp, its market share is significantly less than 10%. Users don't seem to be holding their breath for Lotus Development Corp. to introduce 1-2-3 for the Mac, which Lotus officials have discussed without mentioning delivery dates. Lotus' only Mac product, Jazz, proved to be a dismal failure.

Little left for others

Excel has scooped up most of the Macintosh spreadsheet market

1988 MARKET SHARE BY UNIT SHIPMENTS



*Includes Microsoft Multiplan and Ashton-Tate Full Impact

SOURCE: INFOCORP
CW CHART: JOHN YORK

Compaq slims down with Deskpro

BY WILLIAM BRANDEL
CW STAFF

HOUSTON — Compaq Computer Corp. is hoping that personal computer users will think less is more in marketing its Deskpro 286E line.

Compaq, a leader in Intel Corp. 80386-based PC sales, is signaling to the market that 80286-based systems are still vigorous enough for users as it squeezes them into a smaller than usual box. The 286E unit measures 5.9 by 14.8 by 15.8 in. — 100 square inches less than Compaq's Deskpro 286.

The models' pricing is lower than the Deskpro 286, which ranges from $2,699 to $4,199. The Deskpro also includes only 640K bytes of memory, while the 286E has 1M byte. The 286E systems' list prices range from $2,699 to $3,599.

All three Deskpro 286E models use an 80286 processor with a 12-MHz clock speed and 1M byte of memory. The systems also include four 8- and 16-bit expansion slots and one high-speed memory expansion slot.

For the same price, however, users can purchase comparably equipped machines implementing the more robust Intel 80386SX technology, according to Bruce Stephen, senior PC analyst at International Data Corp., a market research firm in Framingham, Mass. Stephen said he believes the Compaq machines are targeting IBM's Personal System/2 Model 50Z in the coveted retail channels.

The entry-level Compaq 286E Model 1 has a 5¼-in. 1.2M-byte disk drive and sells for $2,699. The 286E Model 20 has a 20M-byte fixed disk drive in addition to the 1.2M-byte drive. It is priced at $3,399, according to Compaq.

The 286E Model 40 also includes a 40M-byte fixed disk drive. It costs $3,999. Both of the models offer a disk access time below 29 msec, Compaq claimed. All products run MS-DOS 3.31 and 4.01 in addition to Microsoft Corp.'s OS/2 Version 1.1.

Amstrad wraps service with 286 and 386 PCs

BY SALLY CUSACK
CW STAFF

IRVING, Texas — Amstrad, Inc. recently stepped up its efforts in the IBM Personal Computer arena by packaging a free one-year on-site service policy with its latest PC-compatible systems for the U.S. market.

Amstrad announced the service policy when it introduced the Amstrad PC 2286 and PC 2386, which are based on the Intel Corp. 80286 and 80386 chips. The 21-year-old British company, with a subsidiary based here, has been active in the U.S. for three years. Until now, that U.S. activity had been restricted to PC XT-compatible machines.

The 12-MHz PC 2286 offers 1M byte of random-access memory, expandable to 4M bytes on the motherboard, and a choice of IBM Video Graphics Array (VGA)-compatible monitors. The unit is available with twin 1.4M-byte 3½-in. disk drives or a 40M-byte hard disk with a single floppy drive, the vendor said. It is compatible with Novell, Inc.'s Netware and OS/2 and comes with an Intel 80287 math coprocessor socket.

Flagship

Billed as the flagship of Amstrad's PC 2000 series, the PC 2386 20-MHz machine is aimed at the high-end workstation user. The VGA-compatible system reportedly includes 64K bytes of RAM cache memory and asynchronous expansion bus operations. It is shipped with MS-DOS 4.0 and Microsoft Corp.'s Windows 386 and can also be used with OS/2. RAM is reported to be expandable to 16M bytes on the motherboard, and virtual memory operation allows applications to use hard-disk storage as RAM.

"We're not a rebranded product or an OEM supplier, and that sets us apart from the competition," said Vernon Moore, Amstrad's chief executive officer. "We design our own chip sets; our custom BIOS was written in 1986. With profits over a quarter billion net before taxes last year, we also are providing our dealers with a financially stable company. We will be here 10 years from now."

"No new companies have been introduced to the U.S. market in the past two years," said Fred Helms, vice-president of sales. "We don't expect to compete with IBM and Compaq for the No. 1 and No. 2 slots. We do, however, expect to be ranked as the No. 3 or No. 4 player. To our knowledge, we are the only company to offer a complete package out of the box."

The PC 2286 costs between $2,000 and $3,000. The PC 2386 will cost $6,000 for a standard configuration, which includes 4M bytes of memory and a 65M-byte hard drive. Both units include security locks for network use and are scheduled to ship early this summer.

Helms said the PCs will be distributed exclusively through the firm's Advanced Systems Division to specialty dealers serving corporate end users and to value-added resellers targeting specialty applications.

Barney

FROM PAGE 33

Of course, the PC vendor panelists huffily disagreed, and with that point dispensed with, the self-serving discussions continued.

But the users weren't finished. Later that day, another MISer got fed up and took to the microphone. This gentleman accused the vendors of making decisions based purely on business motives, with little or no regard for customers' interest. Again, the point was shunted aside and the banter continued.

The words echoed in my brain for days afterward. The small contingent of MIS managers at an otherwise vendor-ruled conference was not to be drowned out, no matter how much hype and mud got slung. They made their points quickly and with a dose of eloquence, and in the process, they were as refreshing as the California sunshine to which irked MISers finally fled.

File format hell. The idea germinated when Lotus officials called 1-2-3 Release 3.0 "unclonable" because of the new file format aimed at handling three-dimensional worksheets. They said this like it was a good thing. Little do they realize that this "unclonability" is as much a problem for Lotus as it is for Lotus competitors. It is an even worse problem for users who have already spent years getting hot under the collar because "file format hell" makes data exchange a bother.

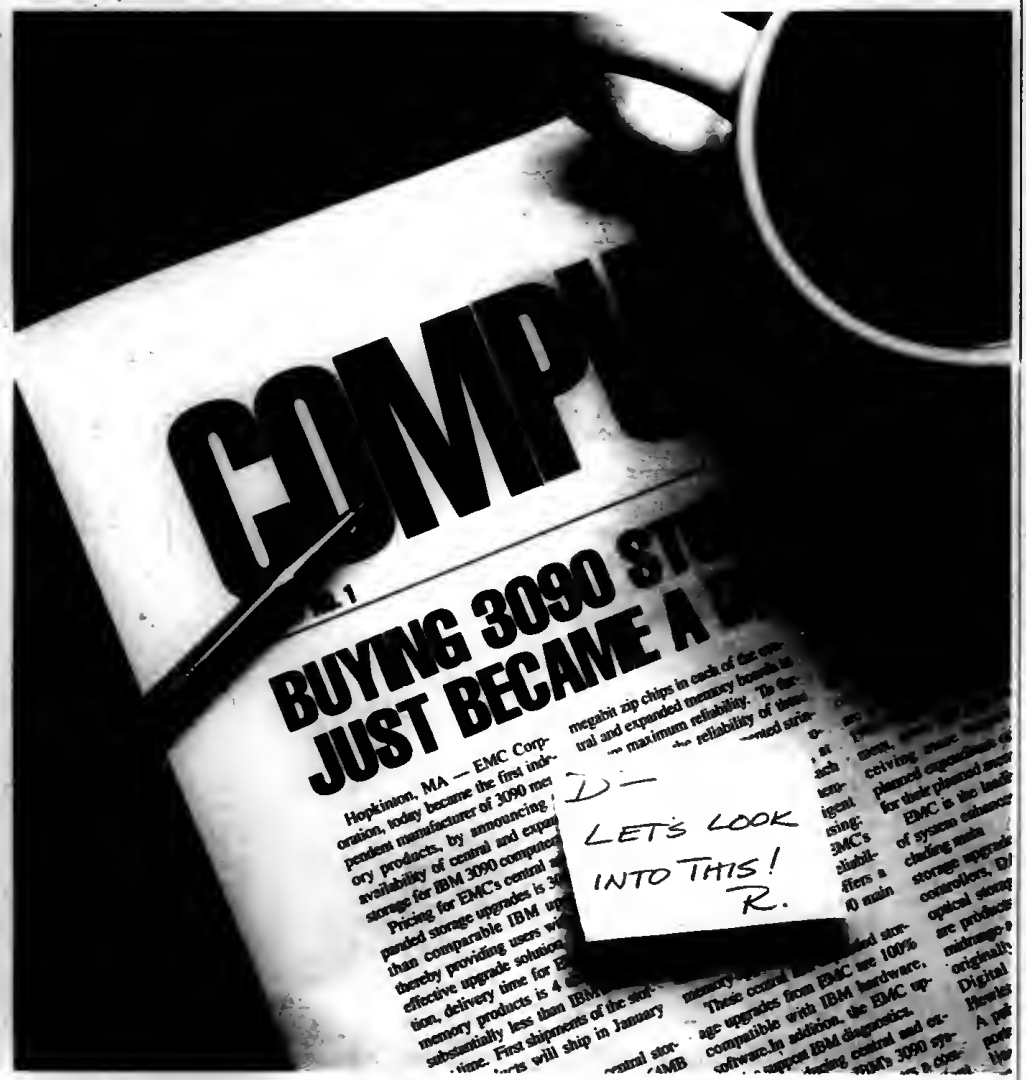
It's good to see the vendors get bitten by the same bug. You see, Lotus has this nifty new product called Magellan that allows people to search for information using keywords (even misspelled ones), locate the file and launch directly into the application that created it.

It's great, except for one problem. Magellan has to understand an application's format in order to allow proper file viewing. Microsoft says that its Windows products will drive Magellan crazy, an argument to which Lotus concedes. But Microsoft character-mode programs such as the unshipped Word 5.0 will also give the Lotus utility fits, says Mike Maples, Microsoft applications chief.

Lotus has a number of solutions, none of which are perfect. One is to write new viewers themselves and another is to convince application vendors to make their software Magellan-compatible. But if Lotus is protective of the Release 3.0 format, why should vendors belly up to Magellan? And how will the nearly constant stream of Magellan updates be distributed?

MAYBE IT was because I was inside smelling smoke and bodies instead of clean desert air, or maybe it was the tone of the panels. In either case, I was ticked off.

Barney is a *Computerworld* senior editor, PCs & workstations.



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Groupware

FROM PAGE 33

and regularity that underlies any organised work activity while also harnessing the power of LANs at the same time, said Roger Moody, chief executive officer at Coordination Technology, Inc. in Trumbull, Conn. The firm plans to launch a groupware product in about a year.

"Look at the LAN platform; it's rigid, precise and formal," he said. "Now look at white-collar work; it's flexible, imprecise and casual." The challenge is developing software that is harmonious with both aspects, he said.

A larger problem for groupware users is that there are few industry standards. Although groupware designed for LANs can run on most of the industry-standard networks such as IBM's PC LAN and Novell, Inc.'s Netware, many of the components such as E-mail and calendaring are proprietary.



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These men started a revolution on campus.



Recently, an information management revolution occurred at the University of Wisconsin–Stevens Point. Dan Goulet from the University and Jim Leonhart of AT&T—campus radicals of a different kind—explain how they were able to realize a bold and complex vision

FEBRUARY 22, 1989

Jim: I remember the first day we met. You had been around the block a few times, but weren't getting the answers you needed.

Dan: We wanted to create a unique education environment: a free-flowing on-line computer campus. We had a vision, and we were looking for someone to help build it.

Jim: A distributed networked computing solution, that's what we'd call it now: a way to process, move and manage information effectively, throughout a widespread organization.

Dan: We talked to many computer vendors before you. We got tired of describing what we needed, so we drew it. That graphic was about 13 feet long.

Jim: More like twenty. The chart showed every information resource on campus linked together, accessible to students, faculty, and administration. It became the wallpaper in my office for fifteen months.

Dan: It was like a blueprint for a data superhighway.

Jim: We put our ISN wide-area network at the center—like an interchange—and built fiber and twisted-pair data lanes to applications running on AT&T 3B2s, DEC, UNISYS and other hosts located in all the departments. We put on- and off-ramps in strategic locations: StarLAN networks that gave access to the highway from workstations.

Dan: We designed everything from the user perspective. The more technically remarkable the system became, the harder we worked to make it approachable.

Jim: Easy for novices, powerful enough for programming students.

Dan: We developed a menu-driven user interface that is consistent and clear. Students and faculty can select applications like checking spelling, transmitting course grades, even browsing through the on-line card catalog of 1.5 million books at the University of Wisconsin–Madison. We wanted desktop power and access, but we wanted to process information where it made the most sense.

Jim: Thinking back, we realized early that the complexity of your vision precluded a single-system focus. You needed open systems.

Dan: You were really the only ones that understood this point. Open systems allow us to use off-the-shelf components; vendors have to bid against each other to get our business. Open systems are the secret.

Jim: It's mind-boggling how much computer power is out there. We wanted to harness it all, yet give a piece to every individual.

Dan: A truly distributed network, one we don't think we'll ever outgrow. We've added 300 WGS workstations in the last five months.

Jim: Dan, where in the world is that wallpaper today?

Dan: We had it bronzed. Today, so many colleges and businesses really need a similar solution. That's probably why we've had so many visits from them lately.

Jim: Little did we know back then, when we first met.

Dan: Oh, something tells me you had a hint.

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THE RESULT

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Alexander

CONTINUED FROM PAGE 37

and greater decision-making responsibilities. Researchers say the PC network is the "nervous system of enabling technology" that allows a company to do business with fewer levels of managers and still boost productivity.

Harvard Business School Professor Lynda Applegate says information technology will dramatically shape the way management will take care of business in the future: Tomorrow's managers will be able to make their organizations more responsive not only to the needs of their employees but also to the demands of their customers.

Applegate and two colleagues have been researching the use of decision-support systems to understand information technology's impact on planning. She envisions managers convening in "automated meeting rooms" that will be used for sharing information verbally and electronically on a local-area network.

"The senior managers listen to different people present their data and then each manager rates it according to criteria that the managers have developed," she explains. "We have not been able to use technology to mediate face-to-face human communication, and there are many, many potential difficulties using it at the wrong time with the wrong kind of group. We don't have a good understanding yet of how these groups work."

"During the idea-generation phase, it helps to have executives on-line individually and then face-to-face when consensus is wanted," she says.

Technology-based communication helps to facilitate the early stages of a project because it allows executives a certain anonymity to express ideas without fear of criticism or other potential knocks to the ego.

Also, many decisions take longer to make without face-to-face communication, Executives may be more willing to moderate their stance on an issue when they can visually gauge reactions and attitudes of colleagues, she says.

Alexander is a *Computerworld* senior editor, PCs & workstations.



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NEW PRODUCTS

Systems

Wyse Technology has added two high-end personal computers to its line of Intel Corp. 80286- and 80386-based IBM Personal Computer AT-compatible systems.

The 25-MHz Wysesystem 386 Model 3225 was designed for engineering workstation, multiuser and network-server applications, the vendor said. It features zero-wait state and uses a 32-bit memory bus. It reportedly comes configured with 4M bytes of single LU line memory module memory and 64K bytes cache memory. The machine is available in three configurations, with pricing ranging from $8,599 to $12,699.

The Wysepc 286 Model 2116 was reportedly developed for both individual workstations and entry-level multiuser applications. The 16-MHz unit offers one-wait state memory and five expansion slots. Also available in three configurations, the system is priced from $2,899 to $3,599.

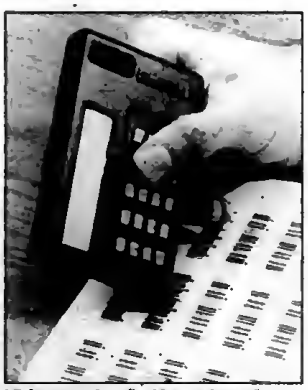
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408-433-1000

Peripherals

A palm-sized, portable bar-code reader has been introduced by Videx, Inc.

The Timewand II includes an RS-232 serial port and 19 buttons with user-definable keys for inventory control, asset tracking, quality control and other applications, the vendor said. Reported to measure 4.1 by 2.6 by 0.6 in. and weighing in at six ounces, the unit is priced at $698.

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503-758-0521



Videx's *palm-sized bar-code reader*

AOC International U.S.A. Ltd. has announced the 300 series of color personal computer monitors.

The 14-in. color-monitor product line includes the CGA-311, the EGA-312, the VGA-313 and the Multisync-314. All are IBM Personal Computer-compatible, and each features a tilt-swivel base and nonglare screen. Pricing ranges from $399.95 to $799.95.

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DATA STREAM

Elisabeth Horwitt

DEC's net gamble



Time has passed, and no official word has come back from DEC and its initial seven third-party supporters on how Enterprise Management Architecture (EMA) is faring. DEC has already missed a tentative March release date for the initial specifications, and no new time frame has been mentioned.

It's no surprise that DEC has taken some heat for its inability (or refusal) to do battle with IBM's Netview and AT&T's Unified Network Management Architecture (UNMA) with something more solid than a concept and a promise of better things to come. But DEC claims that it wants to concentrate on serving up a long-term solution rather than rush a stopgap to market — as it claims AT&T has done. As for IBM's Netview, it is "a veneer over products 10 years old," claims DEC's network marketing manager Bill Gassman.

Of course, most users — including DEC's — like having a veneer that gives them centralized control and monitoring over the various components of their networks. DEC doesn't have one. It has thought seriously about "slapping together" a Decwindows workstation that can collect information from the six or seven Decnet management tools, Gassman says. But this would drain resources

Continued on page 46

Boeing snubs MAP, chooses rival Decnet

BY ELISABETH HORWITT
CW STAFF

SEATTLE — Boeing Co., a major proponent of the Manufacturing Automation Protocol (MAP) networking standard, has chosen DEC's proprietary Decnet for its largest computer-integrated manufacturing installation to date.

Digital Equipment Corp. will act as the prime contractor, providing data management and control systems for Boeing Commercial Airplane's new sheet metal facility. DEC won the contract, estimated at $50 million, away from IBM and Arthur Andersen & Co. subsidiary Andersen Consulting, according to one source.

The contract is a direct result of a two-year effort on DEC's part to develop solid partnerships and integration products with other manufacturing automation vendors, according to Anthony Friscia, president of Advanced Manufacturing Research, Inc. in Cambridge, Mass.

In contrast, IBM only recently began aggressively developing such manufacturing partnerships. "Boeing's charter was to do this project very quickly and to rely on off-the-shelf products — minimizing custom, internal development as much as possible," Friscia said.

DEC won because "it was able to pull together a number of partners and walk in with an integrated team offering that requires minimal customization and no new porting of applications."

The facility is scheduled to go on-line in two years — which is "impressive for a project that size," Friscia said.

Backlog blues

Boeing is building the facility in response to an industrywide, multiyear backlog for commercial airplanes, in which sheet metal production plays an integral part, according to Tom Beckwith, DEC's CIM strategic account manager. "So they need to get the facility up and running as quickly as possible," he added.

The new Sheet Metal Analysis, Retrieval and Tracking System will eliminate "a lot of manual labor involved in scheduling parts," streamline scheduling and reduce the time that material sits in inventory while parts wait on the shop floor, said Boeing spokesman Bryan Barber.

"Right now, it takes 40 days for a part to be scheduled through various shops, when actual time spent working on the part is maybe four or five days," Barber said. "This way, we'll get things just in time."

Factorywide communications will run on DEC's Decnet and Ethernet products. Boeing avoided MAP because "MAP is not mature enough at this stage to risk this factory," according to a spokesman for one of the project's contractors, who requested anonymity.

"MAP still requires a lot of custom software, while Decnet-Ethernet is proven, installed and used extensively by all contractors in the contract," the spokesman said.

While the principals would not give a dollar value for the contract, Friscia estimated it at approximately $50 million, or 20% to 25% of the $235 million budget for building the new facility.

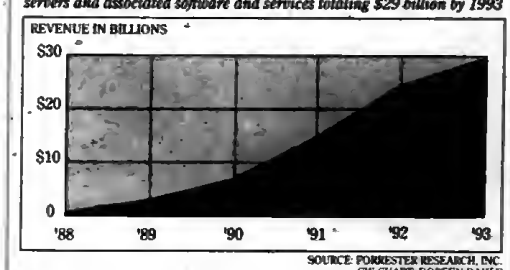
The system will use DEC VAX 6300s as area control systems, Vaxclusters for overall control and Vaxstation 3200 workstations to monitor production.

DEC will also provide links into scheduling, financial and other databases on IBM hosts, Beckwith said. Other contractors in the project include ITP Boston, Inc., Consilium, Inc., Deloitte Haskins and Sells and Oracle Corp.

Data View

The emergence of client/server computing

The market should come of age in the early '90s, with sales from clients, servers and associated software and services totaling $29 billion by 1993



SOURCE: FORRESTER RESEARCH, INC.
CW CHART: DOREEN DAHLE

Power powwowing

OSI fuels proposal from utility industry R&D arm

BY ELLIS BOOKER
CW STAFF

ST. CHARLES, Ill. — The electric power industry recently took a page from the story of the manufacturing field by announcing a communications architecture based on the Open Systems Interconnect (OSI) model.

The Electric Power Research Institute (EPRI), a research and development arm of the power utility industry, hopes to show its 600-member companies the architecture for information systems by the end of the year.

Representatives from approximately 50 power companies met here to discuss the so-called Utility Communications Architecture (UCA) with EPRI and Chicago-based Andersen Consulting. EPRI contracted Andersen Consulting last October to research and develop the protocol.

The technical requirements of UCA, which are expected to be completed in December, promise to put a dent in the power industry's annual $2.5 billion to $5 billion communications budget, according to Lyle Ginsberg, manager of the UCA project at Andersen Consulting. "But we don't want to reinvent the wheel," Ginsberg said.

He added that EPRI and Andersen Consulting are looking closely at existing implementations of the OSI model, including the Manufacturing Automation Protocol (MAP) and the Government Open Systems Interconnect Profile (GOSIP). The research institute joined the

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Horwitt

FROM PAGE 45

from the EMA effort.

Gassman claims that DEC's Vaxcluster network management software has offered for years the equivalent of AT&T's current UNMA product, Accumaster Integrator.

Both systems allow third-party management products to be plugged in as terminals and collect alerts and alarms. But this is basic stuff compared with what EMA will eventually offer, according to Gassman.

Key components of the system include the following:

- Access modules that allow a wide range of proprietary and standardized products to invoke the common functions described above. About 200 vendors have expressed interest in developing such modules, Gassman says, but right now, DEC has kept the number down to a manageable seven.

DEC will develop modules for its own network management products as well as for Transmission Control Protocol/Internet Protocol and Open Systems Interconnect network management protocols.

- Real integration of logical and physical sides of the network. EMA will break up different logical and physical elements of the network — not just multiplexers and modems but different electronic mail systems, for example — and allow communication between these domains to locate trouble spots and fine-tune traffic flow.
- An object-oriented database management system that will be the foundation for expert system applications. "That's one of the nuts we're having a tough time cracking," Gassman admits.

IBM and DEC — not to mention others — are promising such capabilities, too. But DEC's strategy is to present itself as the slow-and-steady tortoise that, by perseverance and a refusal to settle for easy stopgap solutions, will be the first to deliver what users really want.

Will users be willing to wait years for DEC to deliver? Maybe so, considering that other vendors' complete solutions are also years off.

"We're talking 1992 before IBM has a relational DBMS" as well as "pieces and elements" that can handle telecommunications networks, remarked one Merrill Lynch telecom executive.

Since "it's not our business to be building" such a system, Merrill Lynch will probably hold off on any integrated network management solutions and "wait for the industry to settle it," he adds.

*Horwitt is a **Computerworld** senior editor, networking.*

Midwest managers plan to launch David user group

CHICAGO — A number of Midwest customers recently met here to inaugurate the David Systems Users Group, which will provide participants with a technical forum and an interface to the vendor for resolving technical problems.

A board of directors and a slate of officers were elected. Doug Marlowe, manager of Northwest operations at Chicago-based R. R. Donnelley & Sons Co., was named the group's chairman, and Monica Malkowski, division manager of voice communications at Continental Bank in Chicago, was named vice-chairwoman.

Quarterly meetings are planned, and the next one is scheduled for April 18 in Chicago.

David Systems, a local-area network and private branch exchange supplier, said it has several hundreds of customers nationally. "We need to keep Ameritech [David's Midwest distributor] and David on their toes, and this is an excellent way to do that," Marlowe said.

Vicky Hollander at Continental Bank is the program committee chairwoman and can be reached at 312-923-3310.



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Powwowing

FROM PAGE 45

MAP/TOP Users Group last year. In fact, Mike Kaminski, manager of General Motors Corp.'s advanced engineering staff and perhaps the nation's leading MAP advocate, delivered the second-day keynote to the utility group March 22.

Kaminski, who sits on the board of a high-level advisory group within the power industry that initially recommended investigating OSI applications, discussed the advantages of open, international communications protocols. He also encouraged the utility industry to help drive MAP as the standard.

Lawrence Mankoff, project manager at the electrical systems division of EPRI, said UCA will address one of the power industry's unique needs — integrated real-time data acquisition. "Electric companies are among the largest users of real-time systems," he said. "If you run a nuclear power plant, you have to respond in milliseconds to a line outage." An incentive of this nonproprietary architecture, he said, is that it will protect the power firms' equipment and system investments.

According to Andersen Consulting's figures, a medium-size utility can spend $35 million to design, implement and maintain a customized, often vendor-proprietary, communications system.

Currently, IBM dominates the corporate IS centers at many power firms, but the computing power inside the plants — those used for supervisory control and data acquisition (SCADA) applications — is typically provided by firms such as Digital Equipment Corp., Harris Corp., TRW, Inc. and Data General Corp.

The prospect of using UCA to connect existing SCADA systems was voiced by a few attendees. "It's not an issue of the SCADA system connecting to the IBM mainframe," said Joe W. Lola, senior IS consultant at Central and South West Services, Inc. "It's a matter of communicating across many SCADA systems and with other utilities."

"We have fiber between the plants," said Gerald H. Luttman, supervisor of communications systems at Southwestern Electric Power Co. "But how do we make them talk together?"

However, because OSI-based architectures such as MAP, GOSIP — and now UCA — are evolving, they have some gaps. Andersen Consulting's Ginsberg admitted that the OSI model's network management component is still fuzzy, a point of concern heard from a few of the attendees at the EPRI event.

BIT BLAST

NET unfolds ISDN plans

Network Equipment Technologies, Inc. has announced that its IDNX line of T1 switches has been certified to act as a pipeline for Integrated Services Digital Network transmissions from **Northern Telecom, Inc.'s** SL-1 private branch exchange (PBX) switches. The switches do not yet support the ISDN D channel protocols that would allow them to participate as routing and control nodes on an ISDN network, said NET product manager Tim Shafer. NET plans to provide that support; meanwhile, it will certify its switches to act as ISDN pipelines for other major PBXs that support the standard, he said.

Advantage Systems, Inc. has agreed to integrate **Compuserve, Inc.'s** packet-switched network service with its own wholesale electronic banking services. Advantage Network Services targets current and prospective users of Advantage's Forte Financial Services System. Forte is said to serve customers of more than 45 banks worldwide.

American Airlines and **United Airlines** have entered an agreement to link their respective travel agent reservation systems, enabling agents on either system to get immediate confirmation and guaranteed bookings on either airline.



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Micrografx announces an easy way to port Windows applications to OS/2 Presentation Manager.

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MANAGER'S JOURNAL

EXECUTIVE TRACK

E. O. (Skip) Stout has been named staff vice-president of information systems and services at **Navistar International Transportation Corp.** in Oak Brook Terrace, Ill. Stout is responsible for all Navistar IS activities and reports to Michael Clayton, vice-president of corporate planning and information systems services.

Stout is also responsible for implementing Navistar's wide-ranging information management strategy, including centralization of IS operations, decentralization of applications development and creation of a corporate information library. "We're coming to grips with what the information utility concept really means," Stout said.

Stout was Navistar's director of technology engineering. He joined the Chicago-based firm in 1983 as a senior network consultant.

.....

James P. Keatts has been promoted to vice-president of data security at **First Virginia Services, Inc.**, the data processing affiliate of First Virginia Banks, Inc. in Falls Church, Va.

Keatts joined First Virginia Services in 1984 as data security administrator. He was promoted to DP security officer in 1985 and to assistant vice-president in 1988.

.....

Nils Hokansson has been appointed vice-president of DP at **York Insurance Group of Maine** in Westbrook. Hokansson joined York in 1988 from Hartford Fire Insurance Co., where he served in a number of DP management and staff positions.

.....

Who's on the go?

Changing jobs? Promoting an assistant? Your peers want to know who is coming and going, and *Computerworld* wants to help by mentioning any job changes in Executive Track. When you have news about any staff changes, be sure to drop a note or have your public relations department write to Clinton Wilder, Senior Editor-Management, *Computerworld*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701-9171.

Sound systems in Dixieland

New Orleans bank VP maintains high-tech harmony through old-fashioned values

BY JAMES DALY
CW STAFF

For generations, New Orleans has built a reputation around the good life. The city's scorching Dixieland jazz, lip-searing jambalaya and unbridled carousing of Mardi Gras draw party-goers like moths to a flame.

One thing that The Big Easy is not famous for, however, is being a nesting place for companies employing leading-edge computer technologies.

But the city's acclaim for high times rather than high-tech may be unfair. Only blocks from the ornate grilled balconies of the fabled French Quarter stands First Commerce Corp., a $4.2 billion bank that has also carved its reputation through some equally attractive old-fashioned charms: dependability, consistency and accuracy. James C. Granier has a lot to do with that.

Granier, senior vice-president of the information systems division and a 22-year veteran of the firm, says he believes it is much less important to plant leading-edge technology signposts than to provide clear and correct data that can be accessed quickly. If the information is faulty, he says, the firm's chances of success are comparable to those of a house of cards in a twister.

"What we're talking about is trust," says Granier, 45, in a gentle Southern accent. "The information we provide must not only be timely, it must be accurate."

"Accuracy" is a catchword that comes up a lot in a talk with Granier. He knows that without it, the bank's employees cannot do their jobs. He also knows that without it, he may as well shove his $23 million annual IS budget into a shredder.

"We'll spend money on additional resources, but what we get out must have a commensurate value, and that means it must be accurate," he says.

To achieve this, Granier keeps close tabs on all aspects of operations. Not that he mistrusts his 120-person IS team. "I have held almost every position I supervise now, so it makes it very easy for me to jump right in at a detail level," he says.

But he brandishes this sword gingerly and carefully avoids suffocating his subordinates. "He knows a lot about everyday goings-on, but he's never overbearing with it because I think he enjoys being a teacher," says Max Kyles, manager of computer operations, who has worked with Granier for three years. "But when he's done, he'll tell you what needs to be done and expect you to do it."

The high standards are all part of making Granier's squad serve what he calls the real bosses of the 153-year-old company: the bank's 340 full-time workers. "The employees of First Commerce are our customers," he says. "And they need to be equipped

Continued on page 51

PROFILE: James C. Granier



GLADE MILBY II

Position: *Senior vice-president, IS division, First Commerce Corp.*

Mission: *Ensuring that information systems provide accurate, timely and relevant data to 340 bank employees*

Pitching executive information systems

BY ALAN J. RYAN
CW STAFF

A Boy Scout is standing outside the supermarket selling raffle tickets. He tells you the prize is $100. You buy one. The Girl Scouts come to your door selling cookies. You buy some. Even when you are taking a chance, as with the raffle ticket, you still know exactly what you could end up with.

Unfortunately, selling your chief executive officer on an executive information system (EIS) might not be so easy, nor the benefits so easily explained.

According to a new Arthur Young white paper titled "Implementing Executive Information Systems," the best way to go about selling an EIS in-house is by starting at the top. "Convincing supervisors and midlevel managers that an EIS is a good idea may be constructive," the report states. "However, an EIS is for executives, and they are the ones who will ultimately decide whether or not the EIS has value in the organization. Accordingly, a top-down approach tends to be the most appropriate."

Still, knocking on your CEO's door with a handful of literature on EIS is not the best approach, either. Instead, the report suggests the information systems manager find an executive sponsor who will be able to not only sell his peers on the concept but also be able to break through roadblocks that may come from lower-ranked staffers resistant to change. Such a sponsor should have the respect of the other executives and have a track record for results.

The report adds that an EIS sponsor will often volunteer for the job because he understands the benefits of EIS and wants to see them realized.

Because an EIS is not easily justified by concrete, identifiable cost savings, those promoting the EIS might want to be armed with tangible savings that an EIS can bring about. Savings might include less paper use, clerical time and executive time.

The study does say that the idea of cost justification may not even come up because "executives intuitively understand the value of having all the information they need at their fingertips."

Insurance conclave advocates IS reform

BY CLINTON WILDER
CW STAFF

ORLANDO, Fla. — Insurance companies must make their information systems more decentralized, flexible and responsive, some 1,600 insurance industry IS professionals were told at the recent Life Office Management Association (LOMA) Systems Forum '89 here.

More than one conference speaker quoted economist Arnold Schumpeter's maxim that capitalism means "creative destruction" and exhorted attendees to break down traditional technology and organizational structures to compete in an industry in which electronic distribution methods are becoming a critical success factor.



MIT's Treacy

"We're really at a moment of crisis," said Irwin J. Sitkin, vice-president of corporate administration at Aetna Life & Casualty, who recently announced his retirement [CW, March 13]. "We're sitting on top of a lot of embedded systems written in Cobol. The biggest challenge for the chief IS executive is to deal with all the change that's coming at him."

Toughest competitors

Several LOMA speakers warned that the toughest insurance competitors in the near future will not be the insurance giants but new entrants into the business making use of imaging, expert systems and videotex technologies.

"Experience is turning from an asset into a liability, and IS organizations are part of the problem," said keynote speaker Michael E. Treacy, a professor at MIT's Sloan School of Management. "We've automated historical ways of doing things, and that has made our organizations too inflexible."

"The worst thing you can do is automate the business you're in today," said James P. Ware, principal of the Nolan Norton Institute, a Lexington, Mass.-based IS research concern.

Treacy called traditional insurance IS the automation of "separate stovepipes" — discrete functions such as actuary, claims, sales and marketing that fail to communicate with other functions in the company. Instead, these functions need to share information electronically via messaging systems, strategic cross-functional systems and common databases such as customer information files.

"Independent databases are both redundant and inconsistent," said James A. Langenwalter, a director of The Innovative Group, a Pittsburgh-based consultancy specializing in customer information file design.

The strategic use, delivery and presentation of data itself — not hardware or software — will be the focus of insurance industry IS in the 1990s, said John A. Fibiger, president of Boston-based The New England. "The technology limitations are going away," he said.

Nearly all speakers agreed that senior management must take the lead in implementing change by rethinking their business, taking technology investment risks and rejecting traditional IS accounting methods.

"You almost have to go on instinct," Fibiger said, when asked how he measures the effectiveness of IS at The New England. "No cost-benefit analysis will substitute for the informed guess about where the company is going and how technology will support that goal."

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Dixieland

FROM PAGE 49

with the finest tools for the job. In most cases, those tools are the information we provide."

To that end, Granier stays in close contact with his staff. A meeting takes place every Tuesday at 9 a.m., and "it would take a pretty serious act to stop us from having that meeting," he says. "It's basically a roundtable talk where we can talk about problems we're having or causing each other."

Granier sweetens his intimate knowledge of what makes the bank tick with a self-deprecating sense of humor; in front of staffers, he proudly claims to be "the fattest jogger in my neighborhood."

Granier is not above having himself and his office judged. Each quarter, the IS division goes in for a quick reality check when a rating survey is dropped into the mailboxes of administrative personnel ranging from department heads to a head teller at a local branch.

"We compare what we think of ourselves with what others think. It's always very enlightening," Granier says.

But the checks do not stop there. Some quality control reports come out daily. These summations can measure everything from the percent of work that arrives on schedule to the response lag time.

"If it's late, we want to know why it is late; if things are off, we begin an analysis immediately," Granier says. "The smaller problem is often indicative of a larger one: Is it hardware or software breaking down, or are we running out of power on the mainframe?"

Like many people in his position, Granier joined the information processing industry when the field began to flower in the 1960s. But it was not his first choice as a profession.

After graduating with a degree in general business from a nearby state college in 1965, he began work as a mathematics teacher. But the pay was poor, and he was not getting anywhere. Night courses in psychology at nearby Loyola University and Tulane University occupied his spare time.

> "HE KNOWS a lot about everyday goings-on, but he's never overbearing with it because I think he enjoys being a teacher."
>
> MAX KYLES
> FIRST COMMERCE

Analytical attraction

A newspaper ad for programmer trainees soon caught his eye. "I liked the analytical part of it," he says. He soon found himself with a job as a programmer trainee at First Commerce. Working on an IBM 1401, he found his new profession "very exciting. Everything was new and being designed. Even today, we are still rewriting and redesigning the same basic principles put in place 20 years ago."

The core of First Commerce's computer network resides at a data center about 10 miles west of town; where a 5-year-old IBM 3081K and an IBM 4381 reside. These machines hook up the five affiliate banks that make up First Commerce.

These machines also help power First Commerce's Callfirst system. Using Callfirst, customers can satisfy many of their banking needs over the phone. By dialing a specific number, customers check on their account balances, transfer money, get an update on their last five checks or even pay their Visa bills.

Although Granier takes his job very seriously — 10-hour days are the norm — he is not obsessed by his profession. He loves sports and beams when he speaks of spending time with his family.

Still, once the day's starting whistle blows, he is dead serious about his plans for First Commerce.

"Trust is really the key," he says. "If we don't have that, we're not much of a department."



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*Datapro, *User Ratings of Network Management Systems*, September, 1988
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CW4/3/89

The push for proof of information systems payoff

BY MICHAEL L. SULLIVAN-TRAINOR

Faced with tight budgets and new business requirements, MIS executives are going to extremes to prove the value of computer investments.

For example, Robert Rubin, information systems director at Philadelphia-based Pennwalt Corp., recently told the company's senior management about the benefits of a cash-management application to the firm's earnings per share.

"I did it to reinforce the fact that we view systems as a supporting element of our business functions and not as a cost," Rubin says.

The new system's impact on earnings per share was minimal but measurable. The chemical firm's management got the point and agreed that the system did add revenue to the bottom line.

Although Rubin's cost-justification method may be unusual, the circumstances he faces are not unique. Senior management is putting MIS under a double-barreled gun, asking MIS to develop revenue-generating strategic systems while demanding tighter cost controls.

"If all you are is a cost to the company, you shouldn't be there," Rubin says, echoing the cries of management.

Why are chief executive and financial officers suddenly paying attention, after years of acquiescence to budget increases?

"There is greater urgency to justify expenditures because of cost pressures within the corporation. IS budgets have reached a dollar level that makes them stand out on the balance sheet," says Robert Morison Jr., co-director of Partnership for Research in Information Systems Management (PRISM), a joint research service of the Index Group, Inc. and Hammer & Co. based in Cambridge, Mass.

In fact, IS investments now rival research and development budgets in many companies. For instance, Rockwell International Corp. is spending $450 million per year on information systems, not including investments in technology outside of MIS, according to the 1988 *Computerworld Premier 100*. The large amount being spent in MIS creates greater contention with other departments for closely held corporate dollars.

"We are being asked new questions. Executives at the top want to know why IS is getting to be so big and whether we are getting a real payoff from it," says James Sutter, director of information systems at Rockwell.

These questions are sparking a sudden interest in competitive data about information systems. Frequently cited examples of successful strategic systems, such as American Airlines' Sabre reservation system and American Hospital Supply's client-based ordering system, have caught senior management's attention. Realizing this, MIS executives are trying to establish the idea of technology as an asset in competitive positioning. Some even gather ammunition for their board meetings by trading budget information with others in their industries.

Such strategies are a concession to the fact that the justification and control techniques used in the past do not satisfy today's more cost-aware and payback-conscious senior management. In some instances, these methods have impaired the credibility of MIS.

"There has always been justification for projects as long as I can remember, and sometimes it was as spurious as you could get," says Paul Berger, a Lawrenceville, N.J.-based MIS consultant. "But the actual measurement of MIS performance



JOHN SOLTIS

Pennwalt's Rubin *uses the language of finance when he talks about information systems*

Sullivan-Trainor is a *Computerworld* senior editor, special projects.

INSIDE

Grumman's strategy to dispose of waste
Page 62

How to keep a check on escalation in development projects
Page 64

At Merrill Lynch, users learn about accountability
Page 68

Payoff

FROM PREVIOUS PAGE

and contribution to the business is getting more attention now and that's the one that is tougher to do."

Berger illustrates just how far logic has occasionally been stretched by telling of an MIS department that justified word processing equipment purchases by counting the number of keystrokes made by each operator each day. An increase in keystrokes was supposed to provide after-the-fact confirmation of the system's value.

"It made somebody feel comfortable and was quantifiable, but it was nonsense," he says.

What made the approach even more nonsensical, he adds, is that there were legitimate returns on investment (ROI) that could have been documented, but that were never raised.

Senior managers were never fooled by such flimsy justification, Berger says, but they did not think that the costs were large enough to worry about. The idea of using technology for strategic advantage had not even reached the pages of major business magazines, let alone cost anyone market share.

There was one MIS argument that senior managers did often buy, however. Unfortunately, it was the one that said systems investments could be justified through head-count reduction. Few IS organizations use that measure anymore, because it became outdated as soon as the major manual processes had been automated. MIS is still paying a price for its past reliance on this measure of value.

For one thing, MIS managers who were able to prove work force reductions as a justification for automation expenses are now stuck with the expectation they created.

"We dug our own grave by relying on head-count and expense reduction justification for IS in the past," Morison says. "That mind-set persists, even though the role and importance of information technology to the business is shifting."

A second problem with the head-count method of justification is that it often turns out to be more theory than reality and, as a consequence, sows seeds of doubt. No matter what measures are used by MIS now, some business executives remember and factor in the unfulfilled promises.

Another cost-justification quagmire for MIS is the tendency to use systems performance data such as CPU utilization to justify systems to senior management.

"A classic error is to take internal measures and use them externally to prove that IS is performing well," Morison says. "That is seen as techno-gibberish by senior management."

For example, Berger relates a story about the vice-president of industrial relations at a company who once received a bill for running a personnel system. The bill registered CPU seconds, the number of I/Os and the amount of storage used for a total of $2,000.

"When the vice-president received that bill, he asked, 'What did I get for my $2,000?' Telling him that he got 500 CPU seconds meant zip. It doesn't mean anything to me, and I know the difference," Berger says.



Travelers' Bacon *justifies systems with easy-to-understand data*

Performance results can be a good and valid measure of value, but only if they are presented in business terms that relate directly to end-user interests.

"If you present these measures in a technical way, you're in trouble," claims Larry Bacon, senior vice-president of information systems at The Travelers Corp. "But actually they are pretty simple."

For example, Bacon's group relays systems data to the business function in terms such as the number of reports that were required and whether they were delivered on time, whether the terminals were available and what the response time is like. Unlike technical jargon, these kinds of measures can be verified by user executives.

Perhaps the most prevalent tools used to cost-justify IS in large companies are the standard accounting measures applied by the financial side of the firm. These include calculations of ROI, discounted cash flow and hurdle rates.

While these measures are still widely used, there is a broad consensus forming among MIS executives and consultants that the use of accounting formulas should be restricted because they do not suit all cases. How that restriction is applied varies greatly depending on the company.

The main argument against standard accounting measures is that they do not take into consideration factors such as the broad impact of strategic systems. Such systems, critics of accounting-based justification argue, often possess intangible benefits, which cannot be churned through an ROI formula.

In the manufacturing area, for example, reductions in inventory are a measurable ROI payback for implementing a manufacturing resource planning (MRP) system, but a broad-based computer-integrated manufacturing (CIM) effort is harder to pin down in the stipulated terms.

"In true CIM projects where broad applications extend across functions, a new kind of thinking is required," Rockwell's Sutter says. "CIM causes organizations to shift and people's jobs to change. The whole process is different."

The problem is just as complex in other industries in which service employees are receiving the benefits of computer support, but productivity in terms of volume output is not significantly increasing.

For example, at Southwestern Bell Corp., MIS is implementing a system that will allow sales representatives to quote the rates of phone services more quickly. In the past, the employees did not even attempt to sell the services because the rate variations were too complex to explain without support.

"It is hoped that, because of the system, it will be easier for salespeople to offer those product lines and that will result in more revenue, but would you want to guess how much?" asks Malcom Bliss, vice-president of planning within Southwestern Bell's MIS organization.

The pressure to use accounting calculations to justify MIS investments is coming from senior management. CEOs and CFOs are familiar with the formulas and are no longer willing to authorize purchases on the basis of faith.

Senior management is challenging MIS to conform to standard cost accounting practices or come up with something better.

One tack that many IS executives are taking is to align their investment requests with the business strategy of the company, thus sharing out ownership and diffusing the responsibility for cost-justification and thereby taking the case for strategic systems beyond the realm of MIS alone.

At the same time, most of these same executives are reaching for definable benefits and charting new territory in assessing the value of information systems. The goal is a balance between qualitative corporate advantage and quantifiable benefits.

For example, Baxter Healthcare Corp. uses a two-level justification process. Routine projects are evaluated using accounting measures such as net present value, internal rate of return, payback and profitability. The decisions are made by lower level management.

Strategic systems are evaluated based on a grid that matches the projects against the long-term goals of the corporation. Senior management is involved at this level, providing their perceptions of where the business is heading and what support is needed to help it get there.

"We use the grid as a discussion document and give the project a high, medium or low ranking based on how it matches our goals," says Carl Steiner, vice-president of information resources planning and administration at Baxter Healthcare.

In the case of a strategic system that could potentially increase Baxter's sales and capture market share, the grid analysis method would require examining how critical the project is and whether there would be any loss to the company if it were not implemented.

"We have had a division between strategic projects and routine ones for a long time, but the different justification

Feeling the way

Measuring the return on information technology investment is primarily subjective for both CEOs and information systems managers, according to a survey of 70 of these executives

Measurement method	Percent of respondents	
	CEO	Information officer
Subjective	52%	45%
Only measures cost levels	31%	24%
Project-by-project justification	10%	29%
Competitive advantage	7%	—
Against long-range job plan	—	2%

SOURCE: BOOZ, ALLEN & HAMILTON, INC. CW CHART: JOHN YORK

Measures that work

Partnership for Research in Information Systems Management (PRISM), a joint research service of the Index Group, Inc. and Hammer & Co., has identified the following as the major characteristics of an effective information systems performance measurement program:

- Measurement attention and effort are focused on areas that most need improvement. In many firms, many established measures are deemphasized and attention is shifted away from data center operations to systems development and end-user support.
- Measures are employed to understand and improve both internal performance and external relationships. This means taking measurements from two perspectives, for two audiences, in two languages (one being nontechnical) and according to two degrees of need for improvement.
- Measures are formulated with their indirect as well as direct effects in mind. The content, emphasis, style and administration of measurement programs send consistent and positive messages through the IS and user organizations.
- User satisfaction is measured explicitly, via both surveys (formal and informal) and informal contacts, and user concerns are visibly acted on.
- Objective, quantifiable measures are supplemented by more subjective techniques, most often in systems analysis and end-user services. IS managers carefully balance intuition with quantification, recognizing the limitations and dangers of each.
- Measurement reporting includes concise, business management-oriented summaries. These summaries explicitly relate IS activity to business objectives and priorities. They incorporate simple indicators that communicate — but do not always directly measure — key aspects of IS performance.
- These measures not only document past performance but also monitor the "health" of the IS organization and thus predict its future ability to perform. Indicators such as technical currency and employee turnover reflect how well the IS organization is positioned for the future in the key realms of technology, people, management systems and degree of integration with the firm.
- IS faces the question of its value and contribution to the business realistically and in the context of a larger credibility-building program.

processes have become more structured recently," Steiner says. In the past, he adds, IS tried to come up with an ROI rationale, but if that was not possible, the idea was simply passed along to business executives to evaluate it as they saw fit in light of corporate strategy.

At New York Life Insurance Co., most projects that could be shown to meet business needs were passed from proposal to implementation without much inspection. However, Michael McLaughlin, senior vice-president of information systems, says now the company is subjecting every proposal to greater justification scrutiny.



"Now, we have a good balance. There was a time when we put too little weight on the numbers. We always knew the cost, but we would say, 'This will meet our business needs, and therefore, we will do it,' " he says.

Almost any single project can be accommodated within McLaughlin's $150 million budget, but not the myriad items put forward by business units, called profit centers, within the company. "There's a saying we have at budget time: We can afford to do anything, but not everything," he says.

Routine projects that are aimed at expense reduction or conformance to external factors are tested by a precise cost/benefit formula developed by the controller and MIS. Strategic projects requiring senior management review are weighed first on the scale of business advantage.

"Once the business case is sold philosophically or conceptually, then we get to the dollars," McLaughlin says.

One of the toughest sales pitches McLaughlin must make to senior management is to convince them to invest in unproven technologies. For example, New York Life, like most insurance companies, is considering new image processing applications.

"First I must persuade senior management that this technology is beneficial to our business," he says. "Then I have to convince them that we should change the way we do business to accommodate the technology and achieve the benefits."

So the debate continues, and the image applications are still being evaluated.

If firms such as Baxter Healthcare and New York Life are just beginning to inject more formal accountability into their systems, there are others that are ruled more stringently by numbers.

Charles McCaig, senior vice-president of information systems at Mutual Benefit Life Insurance Co., for example, must maneuver all but the most strategically imperative project proposals past the hurdle of a two-year payback requirement.

The process at Mutual Life involves using accounting measures such as discounted cash flow. MIS reports the cost of the project and the user department forecasts the benefits. The controller acts as a "policeman" evaluating the numbers. If the financial formula shows significant benefit, then the project moves on for senior management review.

"If we justify it with hard-dollar payback, then that project goes to the top of the list. If we do it with soft, cost-avoidance dollars, we may get an okay, but those aren't as solid," McCaig says.

> "EXECUTIVES at the top want to know why IS is getting to be so big and whether we are getting a real payoff from it."
>
> JAMES SUTTER
> ROCKWELL INTERNATIONAL

McCaig is also proposing investments in image processing. But so far, the applications have failed to receive approval because of the two-year-hurdle rate.

"We have not gone forward with imaging because we have not been able to cost-justify it. We had three proposals for imaging and the payback was over three years," McCaig says. "We think we'll be able to do something next year because the cost of technology will go down."

One of the imaging applications carries a price tag of $6 million. "Even adding in soft savings, the company's analysis can't come anywhere close to a two-year payback in benefits. We think there are bigger savings there, but we're stymied because the line area provides the benefit side of the equation," he says.

Despite this frustrating situation, McCaig is in a better position than two years ago when he had to justify the entire IS function.

"The company was going to make major cutbacks in everyone's budget and I didn't think that was an appropriate thing to do in the technology area, so we spent a lot of time on justification," he says. "Our goal was to make sure they understand the difference between the money that goes to pay the electric bill and money that's used to build a system."

It took six months for McCaig to prove his point. His staff spent the time gathering data about the costs and all the conceivable benefits of information systems.

Ultimately, McCaig showed that MIS had a $40 million annual budget but was worth over $500 million as an asset in terms of replacement costs.

"We showed them all the pieces and why they were there. We convinced them that it was an asset, and then they asked if the asset was doing anything. So we showed them that it was by demonstrating the improved productivity of the

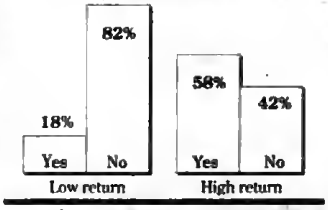
Continued on page 61

Degrees of distaste

Top executives usually blame their measurement systems when the ROI for information systems is low. But even when it is not, many say the measurements are too subjective.

PERCENT OF RESPONDENTS (BASE OF 70)

Q: Is the way you measure technology value adequate?



SOURCE: BOOZ, ALLEN & HAMILTON INC.
CW CHART: JOHN YORK

Time saved in the right places can add up to big efficiencies

BY DAVID GABEL

Information systems executives looking for ways of demonstrating the strategic importance of their function may want to seize the time issue.

Saving time is not a new concept. For the most part, however, the emphasis has been on improved efficiency at the clerical levels. By now, most of the savings that can be realized by automating functions among those groups have been factored; the real action has moved to other locales.

The places where organizations are looking for speedups now are in the synapses between departments and the executive suite. Fast-cycle capability is becoming the new buzzword as companies search for new ways to trim the time between development and product release.



Babson's Kanter

Everyone is saying that speed and snap-to capability will determine the winners during the next few years, both in terms of beating the competition and staying a step ahead of tough economic realities. For example, a time-based competition study recently completed by the Boston Consulting Group cites instances in which clients, by taking time out of their operations, improved their labor productivity and their asset productivity by two and doubled their product-line breadth. Multiplying these together gives you an eightfold improvement just by being conscious of time spent doing things and then eliminating the wasted time.

At the executive level, time savings may not be quite as quantifiable, but it is every bit as needed, according to Jerry Kanter, director of the Center for Information Management Studies at Babson College in Wellesley, Mass. "Every executive has problems with time these days," he says. "They are in a reactive mode when people are telling them to establish their vision, which is hard to do when you're in a sea of alligators."

It is not easy for MIS to reach into the areas where time compression is most needed. What makes it difficult, explains Paul Clermont, principal of Nolan, Norton & Co., a Boston-based consulting group, is that MIS people do not typically know a lot about sales and marketing or production and shipping, and time cycle reduction touches on all those areas.

Lack of specialized knowledge does not have to preclude IS involvement. What is important, says Rudyard Istvan, senior vice-president of the Boston Consulting Group, is to establish communication with relevant departments.

You can sometimes get results just by using existing technology to facilitate information sharing, Clermont says. For example, he notes, one of his clients wanted to develop a new product but did not have a large enough design staff in any one city to do the work. Because workers were not willing to relocate and the client did not have the time to shuffle people between cities, they invested in high-speed communications links capable of transmitting design and graphics information between the U.S. and UK. This allowed the client to handle design with few meetings, and the project was finished faster than would have been possible otherwise.

That kind of benefit does not fit neatly into the traditional capital-budgeting model, Istvan notes, but if the targets are well selected, the improvements will be indisputable. Even more important, they will speak to top managers in terms they can understand and appreciate. ●

Gabel is a free-lance writer based in Northport, N.Y.

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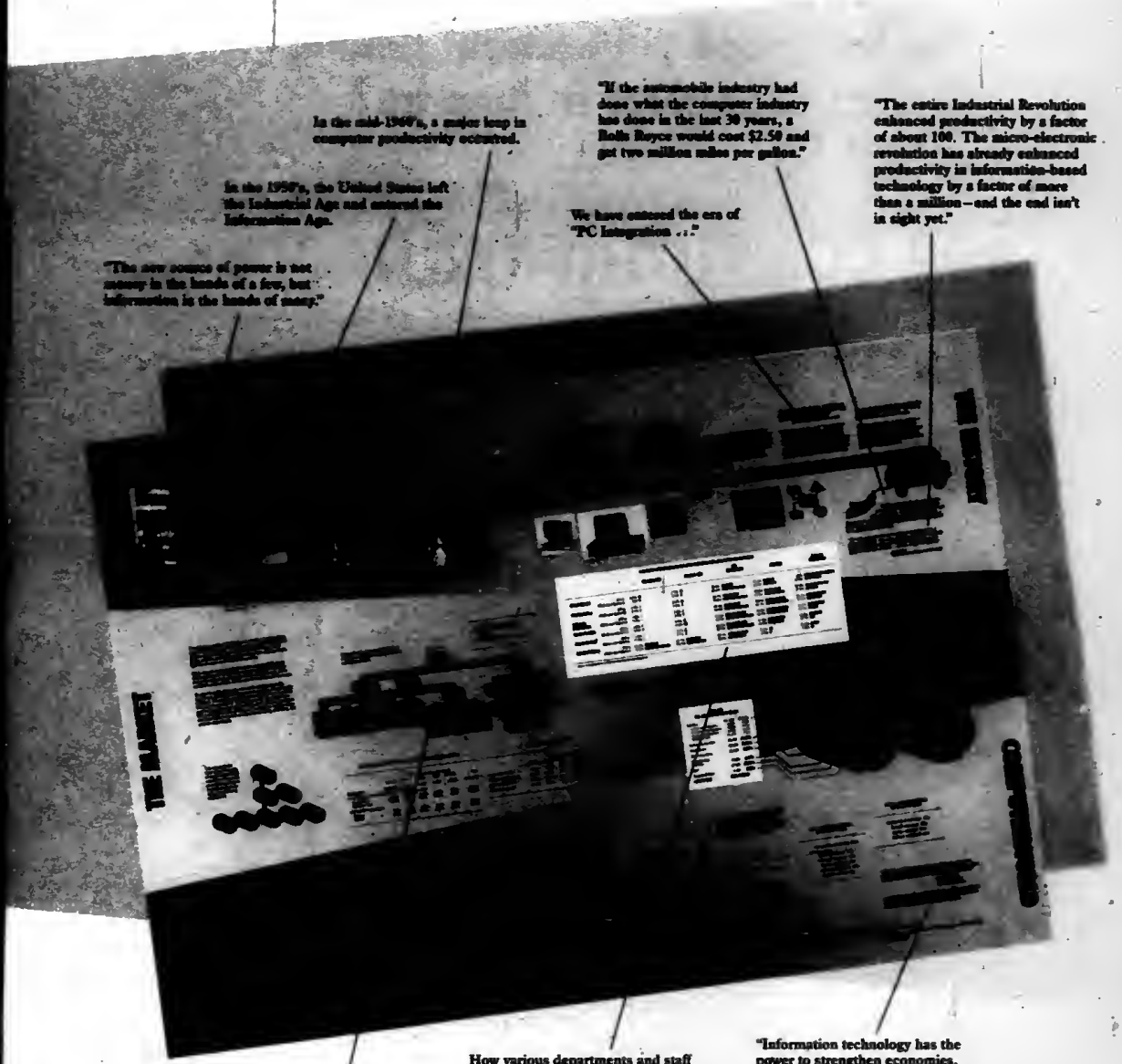
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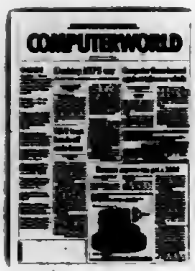
As technology has changed from mainframe to mini to micro – and as low-cost computer-to-computer communications has become a reality, these professionals have adopted the new technologies in a never-ending effort to keep their corporate information systems current. And they have relied on *Computerworld* to keep them abreast of the incredibly rapid changes that have characterized this business since the beginning. Today, *Computerworld* has a total audience of more than 600,000 computer professionals (ABC-audited). And it is truly the newspaper of record for information systems management.

To put everything in perspective, we have taken a brief look at where this young industry has been and how it is doing right now. It's all shown in the poster pictured here. Life size, it's 26″ by 38″, and it's full of interesting information on the new Information Age.



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Payoff

FROM PAGE 57

company," he says.

McCaig views the justification of MIS as a multistaged growth process that evolves as senior management and MIS mature together at a company. The stages are as follows:

• In the beginning MIS must run its own business. Management will not want to finance new projects if the network is down and there are a lot of problems.

"A lot of organizations went through that. They couldn't get systems to stay up and they had runaway application development projects," McCaig says.

• The next stage involves MIS aligning with the business areas and establishing partnerships to develop some credibility with line managers.



"THERE'S a saying we have at budget time: We can afford to do anything, but not everything."

MICHAEL McLAUGHLIN
NEW YORK LIFE

• After that, senior management begins asking, "We are spending a lot on MIS, it works, and it seems to be doing what the line areas want, but I wonder if we are spending the right amount?"

• Once that question is answered favorably, the focus turns to getting the most out of technology through strategic applications.

"At the self-actualization stage, everyone believes MIS can make the difference: MIS is convinced, line management is convinced; now, we've got to figure out how," McCaig says.

Changes in the management team or the business can cause MIS to move backward in this chain of events, but McCaig contends that an organization cannot reach the more advanced stages without successfully completing all of the basics.

"If you have no credibility, you won't succeed with partnerships. If you don't have end-user computing, the business side won't understand strategic advantage," he says.

At the final stage of MIS maturity, the organization ceases to be separate and is seen as an integral part of the business.

When MIS reaches that stage, some consultants and managers believe the question of "Are we spending the right amount on information systems?" does not make sense because MIS cannot be evaluated accurately outside of the business functions.

Many experts see that scenario as the only logical outcome and possibly the ultimate benefit. At their most effective, PRISM's Morison says, information systems and support will be so interwoven with the business that trying to analyze their worth as a separate entity would be "like pulling a number of strands from a fabric and holding them out to ask, 'What is their value?' They have no value apart from the fabric itself."

MIS at Pennwalt comes very close to meeting this model. Rubin reports directly to the CEO and was brought on board to manage systems as a tool to improve profitability like any other business function.

An emphasis on increasing the bottom line does not mean that MIS costs must also grow. In fact, Pennwalt has reduced the amount it spends on systems each of the past four years. At the same time, the company is keeping pace with its competitors' uses of technology to improve products and services.

"It's a myth that paying attention to business needs increases costs," Rubin says. "Being better focused on what you need to do can lower costs." •



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Grumman puts brakes on costs

How a strategic planning program is helping curb firm's computer expenses

ON SITE

BY FRANK ORTOLANI

BETHPAGE, N.Y. — In 1984, the rate of computer growth at Grumman Corp. peaked at 30%. Since then, and as a result of a cost-justification program based on strategic planning, inflation has been significantly curbed.

For each of the past three years, we at Grumman have reduced our computer growth rate by 6% to 7%. In 1989, we expect to achieve a no-growth status for the first time.

It should be noted that during this same period, Grumman — a Fortune 200 aerospace, electronics and specialty vehicles manufacturer with 25,000 employees and more than 100 locations worldwide — revitalized its computerization and business methods. The result for us has been more value at significantly less cost.

Some credit for reduced computer growth must be given to the maturity of Grumman's computerization program. When we began our drive to control costs, there were already hundreds of mainframes, minicomputers and supercomputers installed as well as many thousands of terminals and peripherals in networked systems.

But because we continue to improve our systems and install new equipment and methods, the main credit for the cost containment must go to our cost-justification program.

Thanks to strategic planning and the connected process of transforming business methods, the company has been able to achieve 10 years of benefits in just six years.

The reduction and stabilization of computer cost growth is clearly reflected in our bottom line. In addition, we have materially improved our strategic manufacturing and marketing abilities, which impact not only the present but also the future.

Strategic benefits

Grumman's current approach to managing computers and computer costs is simple and straightforward. We say, in effect, that computerization can no longer be justified on a purely local basis — within a group, department or division of the company. Instead, there must be a direct connection between any proposed improvements and furtherance of the company's market position.

It must be demonstrated that new systems or system enhancements will serve a strategic purpose: to make Grumman a higher quality, lower cost manufacturer or to enhance the company's productivity, competitiveness and attractiveness to customers.

For example, if the food services department says it needs improved systems, we now ask exactly how that improvement will contribute to the big picture. If the proposed change does not meet the criteria — if all it presents is a way to improve the food service operation and possibly produce a small savings — the request will likely be denied.

Our view is that strategic benefits are gained not only by what contributes directly to the bottom line but also by optimized computerization that serves as a resource for strategic information.



Grumman's Ortolani

There are tasks that the company must do well in order to perform on contracts and market our capabilities. These "pressure points," which have become our guides to improving our computerization, include procuring materials, designing and manufacturing products, marketing our capabilities and gathering and evaluating information.

What we are talking about here is something very different from data processing. In fact, we've thrown out a lot of the old terms such as "task support," "departmental and divisional DP" and "islands of automation." We are more than satisfied with data processing as an effective way to manage data, a fact we take for granted. Now we are concerned with the creation and distribution of information and its maximally effective use in achieving strategic corporate goals. Some of the steps we have taken in this direction include:

• **Management planning.** At one time, information resources planning was a tactical, operational process for current and near-term needs. The various groups within the company did not regularly or exhaustively discuss these issues. Under the old regime, marketing, sales, productivity and the bottom line were not the main issues. Instead, what was evaluated was the specific information resources request in its individual context.

Our current management planning process takes another view entirely. Top management plays a key role in evaluating proposed projects within the context of a five-year horizon. The process applies strategic business and market planning to such factors as technology, capital, facilities and information resources.

Projects of intermediate or low strategic benefit are still considered but are subjected to a traditional return-on-investment analysis and given lower priority.

• **Method examination.** Once the information resources department receives the go-ahead on a proposal, the project is evaluated and planned by a matrixed team made up of information resources staff, users and management.

Initially, we evaluate the current business procedures and question each step in the process. Our goal is not to lay new computerization over existing methods but to transform the methods into a new, more productive configuration.

We are currently doing this with procurement. Grumman has many procurement departments in its various divisions, but the company is no longer interested in improving a single procurement operation. Instead, our focus is on improving, linking and standardizing the company's total procurement process.

Another project Grumann is currently engaged in is an executive information system. Although in the past we would have probably given management computer tools to improve what they were already working on, that is no longer the approach we take.

> THANKS TO STRATEGIC planning and the connected process of transforming business methods, the company has been able to achieve 10 years of benefits in just six years.

Instead, we try to provide management with a range of capabilities for problem identification, resolution and anticipation. Some of those capabilities include exception reporting and drill-down, trend and what-if analyses. Also, in contrast with past practice, management is now expected to submit its requests for systems of this type to the same macroeconomic justification process as any other group.

A third project, now complete, which dramatizes strategic advantages, is the automatic test system developed for our aerospace products. By creating an on-line, real-time system that automatically analyzes flight test data, we have reduced total test time by 50%.

In some cases, that time savings has led to a reduction of 20% to 30% in total development time. Considering that the products Grumman develops are in the range of millions to billions of dollars, the cost savings and competitive benefits can be dramatic.

• **Information sharing.** Whenever we install or improve systems, we pay a great deal of attention to maximizing data flow and data sharing. We provide comprehensive connectivity and functionality across divisions, using architectures driven by our major installed base of distributed business, technical and scientific systems. While not limited to these architectures, we are partial to them purely on the basis of cost-effectiveness.

In applications, we seek to satisfy two needs at the same time — the end user's application need and the corporation's need for shared data. In the same way, we respond to common needs in our multiple divisions through either the integration of functional requirements or systems interfaces.

All new computerization will be based on Grumman's corporate architectural standard, including data dictionaries, data attributes and database management. While the content, quality and accuracy of the data are the responsibility of the division or department that creates it, all data is "owned" by the corporation in our scheme, which precludes private ownership.

• **Minimization of software development.** Although we remain willing to create new software if it is really needed and not otherwise available, we now encourage divisions to buy or integrate commercial software where possible.

We feel that many good software programs are available off the shelf at considerably lower cost than programs developed in-house. In addition, purchasing proven applications will also help us to improve — and possibly transform — operations because the products already implement successful business methods.

Another benefit of purchased software is that it is supported by the manufacturer, which is less expensive than trying to support it with in-house personnel.

Computers have more potential than most users realize. At Grumman, we feel that cost justification based on strategic planning has brought our corporation much closer to the full realization of that potential. •

Ortolani is director of information resource management at Grumman Data Systems in Bethpage, N.Y.

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COGNOS

Battling project escalation

BY RICHARD J. ORLI

The building of information systems has not yet reached the level of predictability that is taken for granted in traditional engineering disciplines. The result is often escalation, the increase of controllable project costs beyond planned levels.

Escalation is not always something that can or should be avoided. Sometimes it is the proper response to changing conditions and new information. Escalation only becomes dangerous when no one notices that it is happening in time to react.

It is very easy for projects to grow in complexity and scope as different people with different needs become involved. It is also easy for projects to fall into traps of endless reviews, re-specifications, redesigns and recoding. That is why it is important that changes to projects and commitments of additional resources be accompanied with a review, by all parties, of the project's assumptions and goals. If additional resources seem to be required, then an informed decision must be made to either add these resources or bail out.

Orli is a consultant at Deloitte Haskins & Sells in Washington, D.C.

The basic causes of escalation boil down to errors in the original plan, errors in execution and changes to the project and its environment.

Plans are necessarily based on imperfect information, so it is no surprise that they are routinely wrong. It is also a safe bet that underestimates are more common than overestimates. Underestimation can involve unit costs, amount or availability of resources or the complexity and extent of the project. More seriously, it may be discovered that the project, as conceived, addresses the wrong problem. The real problem may call for a totally different approach, perhaps a major rework or an altogether new project.

Even with the best-drawn designs, execution errors are inevitable, and a certain number of them should be factored into every project plan. The estimation process should also assess the risks of using new methods and forging into unknown territories.

Project changes are common escalation culprits. Changes usually fall into one of four categories:

- Alterations in objectives or requirements because of environmental factors such as new government regulations, market opportunities and competition.
- Resource availability changes, principally involving key personnel.
- Shifts that affect project "personality." These might involve the arrival of a new project manager intent on remodeling the project to suit personal tastes or a change of customer representatives.
- "Gold plating," the addition of superfluous touches to projects in progress.

Gold plating is particularly difficult to identify and deal with because doing so calls for a subjective judgment.

A number of steps take the guesswork out of the difficult decisions involved in controlling project escalation. One is an understanding of the psychology of project escalation. Another is the presence of institutional mechanisms to monitor plans and costs. Finally, managers must be equipped with analytical techniques for cost-benefit analyses so that they will have the hard data on which to base judgments.

The psychology of escalation

Researchers investigating the psychology of project escalation say that people tend to stick with projects they have committed to, despite indications that the project will not repay further investment.

Barry M. Staw and Jerry Ross, two leading researchers in escalation psychology, divide the forces of escalation in two: those that lead to errors in calculating costs and benefits, and those that create commitment to a failing course of action.

Some of the following psychological factors are at work in calculation errors:

Systematic underestimation. Project underestimation may reflect genuine optimism, but it may also indicate a deliberate use of the foot-in-the-door method (trying to gain approval first and discussing true costs later). Still another possibility is that the planner may believe that making an unrealistically low estimate will encourage hard work.

Overconfidence. Individuals with high self-confidence feel less compelled to search for critical information, even when faced with difficulties.

Personal bias. People cast new information in the mold of their expectations and beliefs. Whatever does not fit the mold is dismissed as irrelevant. Ambiguous data is selectively analyzed.

Selective blindness. The true costs of a project may be ignored because they lack salience or relevance to the decision maker, compared with the perceived glory of its completion.

Lack of accountability. Sometimes individuals stand to gain more from small successes than they would lose from larger failures.

Even when a project manager recognizes that a development effort is out of control, he may persist for a number of reasons. Some of the following forces can entrap an individual in a course of action leading to failure:

Self-justification. Maintaining self-image by defending a prior decision.

Continued on page 66



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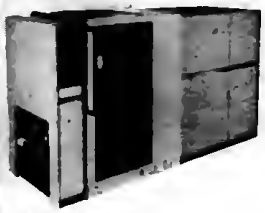
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COGNOS

Escalation

FROM PAGE 64

Face-saving. Reluctance to admit mistakes to others often pushes people to delay, hoping that problems will solve themselves or that everyone will forget who is responsible.

Distaste for quitters. Perseverance and consistency are valued personal and leadership traits that present a mask of confidence and stability.

You are your work. The individual and group become associated with the project. Project termination is equated to both personal and group failure.

The naysayer stigma. Projects happen because somebody has enough vision and drive to gain support and get resources committed. Championing project cancellation is perceived as the antithesis to this highly desirable behavior.

Institutional inertia. Changing directions can be difficult in any environment. Project changes set off a cascade of related alterations, potentially including unpopular ones such as staff reductions.

Preserving the investment. It may be felt that, if a project is not finished, all the money already spent on it will go down the drain.

Competition. If rivalry exists with other development units, withdrawal may be counted as a loss in the competition.

Political promises. Projects often develop alliances and political constituencies with independent expectations.

Understanding the psychology of escalation can help you properly manage projects that might otherwise drift out of control, but it is not a full solution. Proper control also requires institutional safeguards and objective techniques both at key review points and as part of the routine business of management.

Ensuring realistic appraisals

Properly designed cost- and management-accounting policies can draw attention to escalation before it becomes a major problem. Cost-accounting measures address the need for accurate and consistent information on costs. Management-accounting requirements help establish the ground rules for resource use and unit interaction. Together, they help to ensure realistic project appraisals.

An example of the available powerful escalation control device is zero-based budgeting, whereby each project must be fully justified during every budget period and approval must be obtained to gain additional resources for any project.

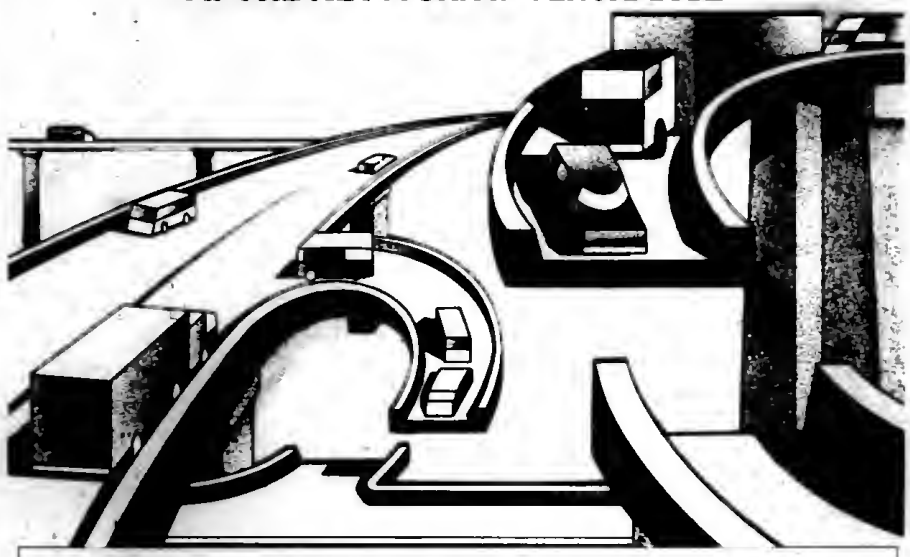
There are three kinds of critical review points in the project life cycle. The first is at scheduled milestones. The second comes whenever there is an increase in controllable project costs beyond what can be explained as a normal factor of inflation. The third is at any point at which the project changes from the baseline of the original plan.

Usually, an informal cost-benefit analysis will suffice. However, a formal analysis can be a bargain when intuitive judgment is most likely skewed by escalation psychology, or when sound analysis must be communicated or "sold."

Standard project management wisdom holds that management and individual commitment are central to the success of IS development projects. Unfortunately, too much of this good thing can transform a routine minor miscalculation into a memorable disaster.

Understanding escalation from both psychological and economic perspectives supports better, more objective decisions. Interpreting escalation from the point of view of the decision maker, rather than from that of an abstract project bottom line, reveals the real motives for many project decision escalations. •

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Ongoing projects

The methods used to analyze continuing projects are similar to those used for cost-justifying new projects. Most aspects of standard cost-benefit analysis apply, such as valuing future income less than current income and estimating risk.

An effort must be made, however, to count only future costs and projected benefits, disregarding committed investments and realized benefits.

The basic evaluation process involves the following actions:

- Analyze the benefits of what the completed project is worth from this point on. Count everything; remember that intangibles such as prestige and experience can be valuable.
- Analyze the cost of what the project will cost to finish (from this point on).
- Calculate the net current value of the project as currently constituted, compared with alternative courses of action such as postponement of new requirements, adjustment of project duration, abandonment in favor of other projects and termination or suspension of the effort. Net current value is the expected return for the total investment, adjusting the time value of future income to current value.

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Merrill Lynch finds the key to control lies in accountability

BY ALAN RADDING

With an annual budget of $155 million for software development, it is hard to imagine that Merrill Lynch & Co. would have to be concerned about keeping a lid on costs. But, as any monied person will tell you, as the resources increase, so do the demands.

There are currently 247 application development projects under way just within the company's Advanced Office Systems Group, which supports field offices with front-end systems for financial consultants. With that much going on, the demands on resources are tremendous and the need for tight controls is great.

Two years ago, the company decided to take action to control spiraling development costs in those groups. According to Greg Toutoundjian, project manager of planning and business support, the primary goal was not necessarily to reduce costs but to ensure that the systems the users were getting were worth the money it took to develop them.

The Advanced Office Systems Group took the first step toward value-based control of development costs in 1987, when it started using Multitrak, a mainframe-based development project planning and monitoring system from Boston-based Multitrak Software Development Corp. The software monitors the progress of system development efforts and compares a project's ultimate cost, as determined by the actual reported expenditures of resources, with the budgeted cost. The system, which provides detailed weekly project-by-project schedule and budget analyses, automatically flags a project when it is going over budget or falling behind schedule.

The success of any project management control program relies on assigning responsibility and accountability and building in an incentive to ensure that participation in the program is self-motivating. So, as an added control measure, the Advanced Office Systems Group instituted a more centralized system of charging back development costs to the end-user departments earlier this year through a department-level monitoring program called the Project Analysis and Reporting System (PARS) program. PARS is a companywide financial-tracking system that relies on monthly activity summaries detailed only to the department level.

By using a charge-back system, the Advanced Office Systems Group is accomplishing two things: It is adding to the accountability of the project management team and transferring fiscal responsibility to the user.



Merrill Lynch's Toutoundjian

Every project is tied to a sponsor who is charged for the development, according to Toutoundjian. MIS comes up with a budget for a proposed project and the sponsor can either approve or reject it. Sometimes sponsors are surprised when they see exactly what their request is going to cost. "It's a bit of a shock," Toutoundjian says.

The Advanced Office Systems Group charges sponsors on the basis of an annual salary and overhead rate of $105,000 per MIS employee. "At that rate, the cost of a project can quickly add up," Toutoundjian notes.

A major advantage of full charge-back, he says, is that if a user is apprised of the costs and still wants to take sponsorship responsibility, then he will become a partner in helping to control costs and guarantee successful completion.

Responsibility and accountability both come into play when a project goes over the approved plan by 15%. If that occurs, the MIS project manager must return to the project sponsor to obtain additional funding or get approval to shift resources from another project. The sponsor can decide to pull the plug on the project, Toutoundjian says, although that happens infrequently. Problems are usually caught early enough to allow for adjustments.

There have been pockets of resistance to the cost-control initiatives, particularly to Multitrak's automated control system. Project managers, for example, balked at having to do their project planning on the system. Toutoundjian admits that going to an automated system was a lot to absorb in a short time and says he soon discovered it was best to let the managers acclimate themselves to the system by first using it for project tracking.

One advantage of having project managers use a system such as Multitrak, Toutoundjian says, is that because the managers provide the project data, they cannot challenge the progress reports.

In spite of the adjustment problems, the department is already seeing a payoff. Sponsors "are taking greater care laying out the specs," Toutoundjian notes, and managers are planning more carefully. •

Radding is a Newton, Mass.-based author specializing in business and technology.



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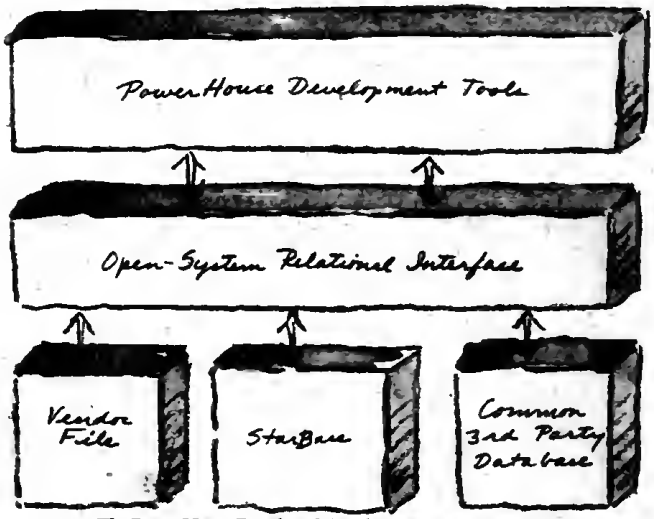
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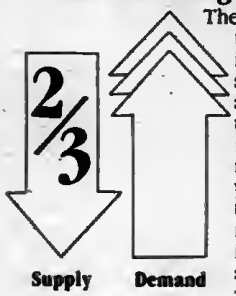
A few important tips on recruiting computer professionals

Finding computer talent isn't as easy as it used to be. In fact, there was a time when you'd just run an ad in the local newspaper and you could make a hire without waiting too long or spending too much.

But times have changed. And like so many facets of today's business, so have the effectiveness of traditional recruiting methods.

What's more, many of today's recruiters *don't use* today's most efficient methods — methods that save time and money for some widely unknown reasons.

The supply of qualified professionals isn't meeting demand



The American Council on Education reports that the number of college students choosing computer careers is down two-thirds since 1982. To make matters worse, there are more computers in today's business that require the skills of this shrinking market than ever before. And while you may never consider the company next door your competitor, it likely *is* competing for the same computer talent today. The result is a classic supply/demand problem that isn't changing for the better — and that's sure to make your recruiting tougher now and into the '90s.

Ads in local papers don't reach your major hiring market anymore



That's because they generally reach "active" job seekers — those who actively seek out the local newspaper to find jobs — and who a recent *Computerworld* job satisfaction survey found to represent 2 in 10 of today's computer professionals. The study also found that 7 in 10 of today's computer professionals are "passive" job seekers — those who would *consider* new job options, but likely never look for them in the local newspaper. (The remaining small percentage are "non-movers" content with long-term jobs.)

For every 10 of today's computer job seekers . . .
2 are Active
7 are Passive
1 is a Non-mover

In short, this means that your ad in today's local newspaper reaches no more than 20 percent of today's computer job seekers. What's worse, if you're not using other vehicles that reach far more job seekers, your local newspaper expenses are as inefficient as their limited audience.

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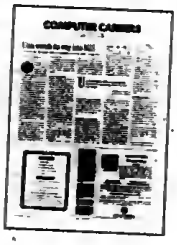
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Charting a safe course to systems integration

What to do when projects careen off track or fail to live up to promises

BY DANIEL W. GASKILL

Systems integration will be the biggest technical challenge facing information systems organizations over the next decade. Because of their size and complexity and the large dose of attendant risk, systems integration projects differ from the smaller, more completely understood software applications that have traditionally been undertaken by IS. They also differ because of their strategic importance to the organization. But in many ways, managing them is similar to managing any project that implements a technology new to the IS organization and to the company as a whole.

Gaskill is a product manager with Holland Systems Corp., a computer-aided software engineering products and services vendor in Ann Arbor, Mich.







ROBIN JAREAUX

Simply put, systems integration is all about delivering the right information to the right person at the right place and time. Chief executive officers in many companies are realizing that achieving this straightforward goal can have an enormous impact on their organization's ability to accomplish its objectives. Achieving a successful systems integration, however, is anything but straightfoward, as anyone who has ever been involved in such a project knows.

By its very nature, systems integration implies something



difficult. It implies making complex technologies work together in untried ways and linking people and machines together through the use of information technology in order to further the goals of the organization.

These projects often include complex requirements for distributing information or for linking disparate organizations through the sharing of data. And if these complexities are not enough, the very size and ambition of such projects can subject them to organizational politics and infighting.

Whether systems integration projects are performed internally or contracted out, IS usually bears responsibility for managing them. Their strategic importance places enormous responsibility on the IS manager to understand the business better and to provide systems that contribute to the organization's success.

It's not the technology

When systems integration projects go awry, people and organizations — not technology — are most often the cause. Although the symptom of a problem is usually a technical failure, the failure is often not the result of a technical impossibility. Therefore, IS should be able to recognize the most common pitfalls that await large systems integration projects and deal with them in ways that substantially reduce the risk of failure.

Three of the most common problems plaguing today's systems integration projects are the following:

- Conflicting, poorly defined or wildly fluctuating requirements.
- Insufficient application-domain knowledge on the project team.
- Communication bottlenecks and lapses.

Since the solutions to these difficulties usually require management action, it is particularly important that IS managers are



- **The heartbreak of analysis paralysis**
- **When CEOs orphan their brainchildren**
- **Communication breakdowns within teams**

aware of the problems and familiarize themselves with the various approaches to addressing them.

Many systems integration projects start out as the brainchild of a powerful senior executive in the organization; often, it is the CEO. However, the brainchild can be orphaned almost as soon as it has been conceived. This happens when the task of requirements definition is put in the hands of an IS manager several steps down the ladder who has little or no access to the idea's originator and only a vague understanding of where to go with it.

Such was the case when a major manufacturer in the Midwest had to abandon an employee compensation and benefits administration system after nine months of requirements analysis because the system's functional scope was never properly established.

Without clear direction, project scope can be manipulated by every powerful user who gets involved in the requirements process. The end result is usually either a project that is too vast for the resources at hand or one that suffers from analysis paralysis because no one is sure where to draw the line.

Get it down on paper

The key to successful requirements definition is a project charter or mission statement and the establishment of a project steering committee.

The project charter spells out, in a short space, the purpose and scope of the project and the organizational goals and objectives that will be served by a successfully implemented system. This brief but crucial document should be put together by the executive who is championing the project.

Because most systems integration projects are large enough to cross the boundaries of organizational units within the enterprise, key executives in the units that will be involved in the project need to approve it. This approval can be obtained by having these key people sign off on the project charter.

Their continued involvement is nearly guaranteed by also asking them to participate in a steering committee for the project. The function of the steering committee is to allocate resources for the project, identify user representatives, monitor progress and approve project deliverables. Including a high-level representative from IS on the steering committee ensures that the technical perspective will be represented.

A steering committee, apart from providing project control at a high level, spreads political risk and political gain — and, in doing so, helps to depoliticize the project. Although the committee's time commitment to the project will be low, the members' continuing involvement ensures necessary managerial support throughout the duration of the project.

The very act of putting together a mission statement and a steering committee for a systems integration project seems to bring these large undertakings into focus. In fact, if a sense of purpose and direction is not achieved, it will be evident in an ill-defined mission statement, and the key executives who are the would-be steering committee participants will not give their approval from the outset.

Fortunately, this process can nip a disaster in the bud before millions of dollars have been spent. If a clear mission statement and cohesive steering committee do

A CLEAR MISSION statement and cohesive steering committee will provide a source of motivation and a sense of direction to the project team.

emerge, they will provide a source of motivation and a sense of direction to the team assembled to work on the project.

Project deliverables

One of the first actual project deliverables is, of course, the requirements document. IS should use the aforementioned charter as a constant reminder of the project's scope and purpose during the requirements definition phase. This process helps both the user representatives and the requirements definition team develop a concept of the "total system," which is essential not only to a well-formulated requirements document but also to a well-designed system. Nothing motivates a project team more than a clear sense of the ultimate value of the project and the belief that the target is achievable.

The role of the steering committee in requirements definition is to resolve interpretation conflicts and to hold the line on pressures to change the scope of the project as it has been documented in the charter. The steering committee's previous commitment to the charter and its growing identification with the project provide incentives to prevent the requirements definition process from getting out of hand.

But while a clear project charter and a steering committee smooth the initial requirements definition phase, they do not eliminate pressures to change requirements during subsequent phases.

In the best of all possible worlds, the systems integration project team would start with a complete and clear requirements specification, and they would be able to hold the environment constant long enough to get the project completed as it was originally specified, thereby

U.S. Companies Involved In ISDN Trials And Service Rollouts

Company	Switch	Access	Carrier	Status	Note
[illegible]	AT&T 5ESS	Basic	Southern New England Telephone	Installation underway	
American Express, Phoenix, Ariz.	AT&T System 85 PBX/4ESS	Primary	AT&T	Started July 1988	Part customer of AT&T's Primary Rate
American Travelers, Jacksonville, Fla.	AT&T System 85 PBX/4ESS	Primary	AT&T	Started Feb. 1989	Beta test site for AT&T's Primary Rate
Arkansas, State of, Phoenix	Northern Telecom DMS-100	Basic	US West Communications	Started Nov. 1988, officially ended	
Boeing Co., Seattle	AT&T 5ESS	Basic	US West Communications	Scheduled start Nov. 1989	
Carnegie Mellon University, Pittsburgh	AT&T 5ESS	Basic		Contract pending	
Comdial Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1989	Paying customer
Control Data Corp., Minneapolis	NEC NEAX 61E	Basic	US West Communications	Started Nov. 1987, ends Nov. 1989	Trial
Duke University, Durham, N.C.	AT&T 5ESS	Basic	Southern Bell		
Eastman Kodak Co., Rochester, N.Y.	Northern Telecom SL-100 PBXs	Primary		Started Aug. 1988	First Primary Rate using two SL-100s
Federal National Mortgage Assoc., Washington	AT&T 5ESS	Basic	C&P Telephone	Started June 1988	
Glaxo Inc., Research Triangle Park, N.C.	SL-1 PBX and DMS-100	Primary/Basic	GTE South	Started June 1988	First Primary Rate/Basic Rate in one trial
Hardees, Rocky Mount, N.C.	Northern Telecom DMS-100	Basic	Carolina Telephone	Scheduled start Jan. 1989	
Hayes Microcomputer Products Inc., Norcross, Ga.	AT&T 5ESS AT&T 5ESS	Basic Basic	Southern Bell Pacific Bell	Started April 1988 Sept. 1987 to Sept. 1988	Using ISDN to develop ISDN products
Hershey Foods Corp., Hershey, Pa.	AT&T 5ESS	Basic	Comm of Pennsylvania	Scheduled start Oct. 1989	Will include ISDN satellite transmission
Honeywell Information Systems (Honeywell Bull), Minneapolis	Northern Telecom DMS-100	Basic	US West Communications	Started Jan. 87, officially ended	Applications included videotex transmission between office and employees at home
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Johns Hopkins Medical Center, Baltimore	AT&T 5ESS	Basic	C&P of Maryland	Contract pending	
Lawrence Livermore Laboratory (University of California), Livermore, Calif.	AT&T 5ESS	Basic	AT&T Federal Systems		
Lockheed Missiles and Space Co. Inc., Sunnyvale, Calif.	AT&T 5ESS	Basic	Pacific Bell	Started Sept. 1987, ended Sept. 1988	Trial
Mass. Institute of Tech., Cambridge	AT&T 5ESS	Basic		Scheduled subnet Oct. 1989	Using AT&T 5ESS as PBX to [illegible] network
Naval Air Force Base, Sacramento, Ca.	AT&T 5ESS	Basic	AT&T Federal Systems	Started Aug. 1988	Used for ISDN [illegible] at 64 kbps
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
McDonnell Douglas Corp., St. Louis		Primary	AT&T	Unannounced	
Monsanto Inc., Concord, Mass.		Basic	New England Telephone	Installation underway	Part of wireless project
Motorola Inc., Schaumburg, Ill.	Northern Telecom DMS-100	Basic	Illinois Bell	Planning stage	
NASA, Washington	AT&T 5ESS	Basic	AT&T Federal Systems		
Nike Corp., Ogden, Utah	Northern Telecom SL-1s	Primary			Telemarketing company using private ISDN
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Northwest Utilities, Hartford, Ct.	Northern Telecom SL-1s	Primary			PBXs at [illegible] Ct. and Meriden, Ct.
Pennsylvania, State of, Harrisburg	Northern Telecom DMS-100	Basic	Bell of Pennsylvania	Contract pending	Statewide network with ISDN in Harrisburg
Pratt & Whitney, East Hartford, Conn.	AT&T 5ESS	Basic	SNET		
Prime Computer Inc., Natick, Mass.	AT&T 5ESS	Basic	Southern Bell	Started April 1989	Paying customer
Rockwell Communication Systems, Richardson, Texas	AT&T 5ESS with two remotes	Basic	Southwestern Bell	Scheduled start Dec. 1988	40 buildings in a campus environment will be linked by ISDN
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Shell Oil Co., Houston	AT&T 5ESS	Basic	Southwestern Bell	Start Sept. 1989	Plan to use 5,000 ISDN lines
Southern Methodist University, Dallas	Siemens EWSD	Basic	Southwestern Bell	Started Feb. 1989	
Southland Service Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1989	Paying customer
3M Corp., St. Paul, Minn.	AT&T 5ESS	Basic	Southwestern Bell	Started Aug. 1988	Plan to use 3,100 ISDN lines
Tenneco Inc., Houston	AT&T 5ESS	Basic	Southwestern Bell	Started June 1988	Plan to use 3,000 ISDN lines
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
University of Arizona, Tucson	AT&T 5ESS	Basic	US West Information Systems Inc.	Planning stage	Using AT&T 5ESS as PBX in private network
University of Connecticut, Storrs	AT&T 5ESS	Basic	SNET		
University of Indiana, Bloomington	Northern Telecom DMS-100	Basic	Indiana Bell		
University of Maryland, College Park				Unannounced	
University of South Florida, Tampa	AT&T 5ESS		GTE South	Started Oct. 1987	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
U.S. Bank of Oregon, Portland	Northern Telecom DMS-100	Basic	US West Communications	Started March 1987	Trial
Virginia, State of, Richmond	AT&T 5ESS	Basic	C&P of Virginia	Started April 1989	
West Virginia University, Morgantown	AT&T 5ESS	Basic	C&P of West Virginia	Scheduled start Dec. 1989	Plan to use 600 ISDN lines

Note: This chart was compiled by Communicationsweek with information provided by Telesis Communications Inc., Saddlebrook, N.J., as well as from news releases and published reports. Carriers, switch manufacturers and their affiliated laboratories are not listed.

ensuring the intended fit between the system and the environment.

However, in our less-than-perfect world, requirements documents are rarely complete, and the business environment — affected by government regulation and deregulation, global competition and economic fluctuations, technological change and so on — refuses to stay the same.

Thus, systems integration project managers must learn to cope with changes to requirements as a matter of course, injecting some flexibility into the implementation process without bowing to every whim expressed by enthusiastic users.

Changing requirements after the requirements definition phase, while sometimes a necessary evil, is best controlled through a formal process. Users often underestimate the effort required to reengineer systems, particularly systems that already push the limits of technology. A formal change-review process will insulate the design team from what might be unrealistic user requests.

The project charter enables the project manager to evaluate all requests to change the requirements against the basic statement of purpose. Any request for a requirements change that is inconsistent with the original purpose and goals of the project may indicate a change in the fundamental reasons for performing the project. Such a change could have serious implications for the ultimate success of the project, because it may mean uncertainty among the project's sponsors as to their true priorities.

If priorities have, indeed, changed, then the steering committee must make a decision about whether to halt the project and rewrite the project charter or to discontinue the project altogether. If the first route is taken, the requirements definition phase must be revisited in order to make the requirements document consistent with the new priorities.

Those requests for changes that do support the original intent as expressed in the charter must be considered legitimate, because they will contribute to the ultimate success of the system. Each legitimate requirements change request must be carefully evaluated for its impact on the project's budget and schedule as well as for the capabilities of the technology that will be used in the implementation. These effects must be identified for the project steering committee, which must make the final decision on whether to go ahead with the change or not.

Expertise shortage

The second potential problem in systems integration projects is a shortage of application skills or knowledge expertise. Systems integration project teams are expected to understand how complex systems would behave under extreme conditions — for example, an airplane landing at an airport during peak traffic hours, an assembly line with machines running at different speeds or a patient-monitoring system operating during a heart failure. The system may require complex analytical capabilities such as those required to evaluate a credit application or determine the correctness of a complex factory order.

In addition, unusual communications requirements may be necessary, as in the example of a national retailing chain's need for a satellite link between its stores and a central computer to approve a purchase on credit within a 10-second response time.

Systems integrators — whether internal or external — are expected to combine sophisticated knowledge of the application domain with technical knowledge of data structures, algorithm design and data communications. Also important is an understanding of how humans will work with the system. Obviously, individuals who possess both expertise in the application area and the required breadth of technical skills are rare. Yet this combination of technical and application knowledge is needed to develop a system design that maps the operational characteristics expected by the system's users into the technical and computational structures that will implement the correct operations.

It is not always immediately obvious when an internal project team does not possess the required level of application domain knowledge. This was the case when a lack of understanding of battlefield environments led one defense contractor to build a computer model based on the wrong set of assumptions. The system worked well and was easy to use but gave results that were off by an order of magnitude. Obviously, severe problems can arise when application knowledge is inaccurately applied to a systems integration effort.

On most successful systems integration projects, one or a few individuals should possess the necessary combination of sophisticated technical knowledge and application expertise. Such individuals can have a very positive impact on projects by transmitting application knowledge to other team members and assuming primary responsibility for systems design. Their superior application knowledge and design skill give them a status of "project guru," or expert.

If IS cannot supply individuals with the right combination of application and technical knowledge, it may be necessary to look outside the organization for assistance. Otherwise, the cost and difficulty of learning the application area during the project may become a significant project expense. Under tight schedule constraints, a design team without such a skilled individual as a member may be unable to achieve the integration of

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application experience and technical knowledge required to develop a coherent architecture and design strategy.

Communications glitches

Large integration projects depend on extensive communication among various parties. The groups that must interact include not only those directly involved in the project — such as the planning and design teams — but users, senior management, quality assurance personnel, vendors and subcontractors, all of whom need to share information and coordinate their activities with the project team.

IS management often incorrectly assumes that the only solution to communication problems is detailed documentation. But critical group interaction cannot be reduced to the mere exchange of documentation. While documentation is an essential component in project management and development, there are many reasons why it falls short as a substitute for face-to-face interaction.

For instance, textual and diagrammatic descriptions often fail to convey the more subtle aspects of systems requirements. Designers need to understand how a system will be expected to function under a variety of different operational scenarios. Detailed consideration of the myriad operating conditions are usually abstracted out of requirements specifications, and when they are included, the specifications become so voluminous that few have the stamina to read them.

On one factory automation project, not one member of the design team had read the more than 1,000 pages in the requirements documentation — understandably. But with neither direct contact with the system's users nor a thorough understanding of the requirements document, designers are apt to work from the more obvious scenarios of system function and neglect the cases that users would ultimately want the system to address.

In order to facilitate direct contact between users and designers, the IS manager should assign a knowledgeable user to the project on an as-needed basis. The user representative must know the application area well and be able to identify other individuals who can be tapped for detailed knowledge in specific domains.

Large integration development teams also face a trade-off between time spent in verbal communication among colleagues and time spent documenting decisions for future project members and each other. Face-to-face encounters are essential in achieving a meeting of the minds and in building team spirit and confidence.

Unfortunately, such meetings are time-consuming and often go through many twists and turns before useful results are obtained. But IS should not abandon the idea without trying additional tactics. For example, on large projects, the use of a scribe can be indispensable in helping to document the process. Creating a database of issues and their resolutions is another helpful strategy.

Many techniques are available for developing and representing system designs. The value of any given technique is highly dependent on the type of system under development and the skill of team members in using the techniques and representation standards for all projects. In fact, it may be necessary to allot some project time for identifying the most appropriate representational tools.

Such an approach would have saved time and money on one project in which the project team, after spending six months trying to develop a logical architecture for a complex, highly interactive expert system using data-flow diagrams, finally abandoned this approach on the advice of an outside consultant.

Once viable representation techniques



are identified, they become powerful tools for facilitating the discussion of system issues. Rather than providing static documentation, diagrams provide a common language and mechanism for reasoned disagreement and evaluation.

Ultimately, IS can best manage the risks associated with systems integration projects by forming a partnership with senior management that will make sharing the risk possible. There are three important elements in this partnership.

First, senior management must involve IS in business planning, where the relevance and need for systems integration is first determined. Second, IS managers must be fully alert to the potential problems with large projects and completely open with organizational sponsors about them. This calls for a candor that has not always been present in the relationship between IS and executive management in the past. The third element is the ability of IS to recognize when it is overmatched by a particular project or when a new undertaking could dangerously increase the portfolio of risk-laden projects already assumed.

The operative words here are obviously openness and cooperation. In any case, IS should be increasingly careful when trying to chart a safe course through systems integration waters. ●



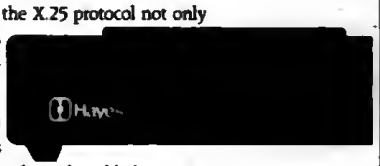
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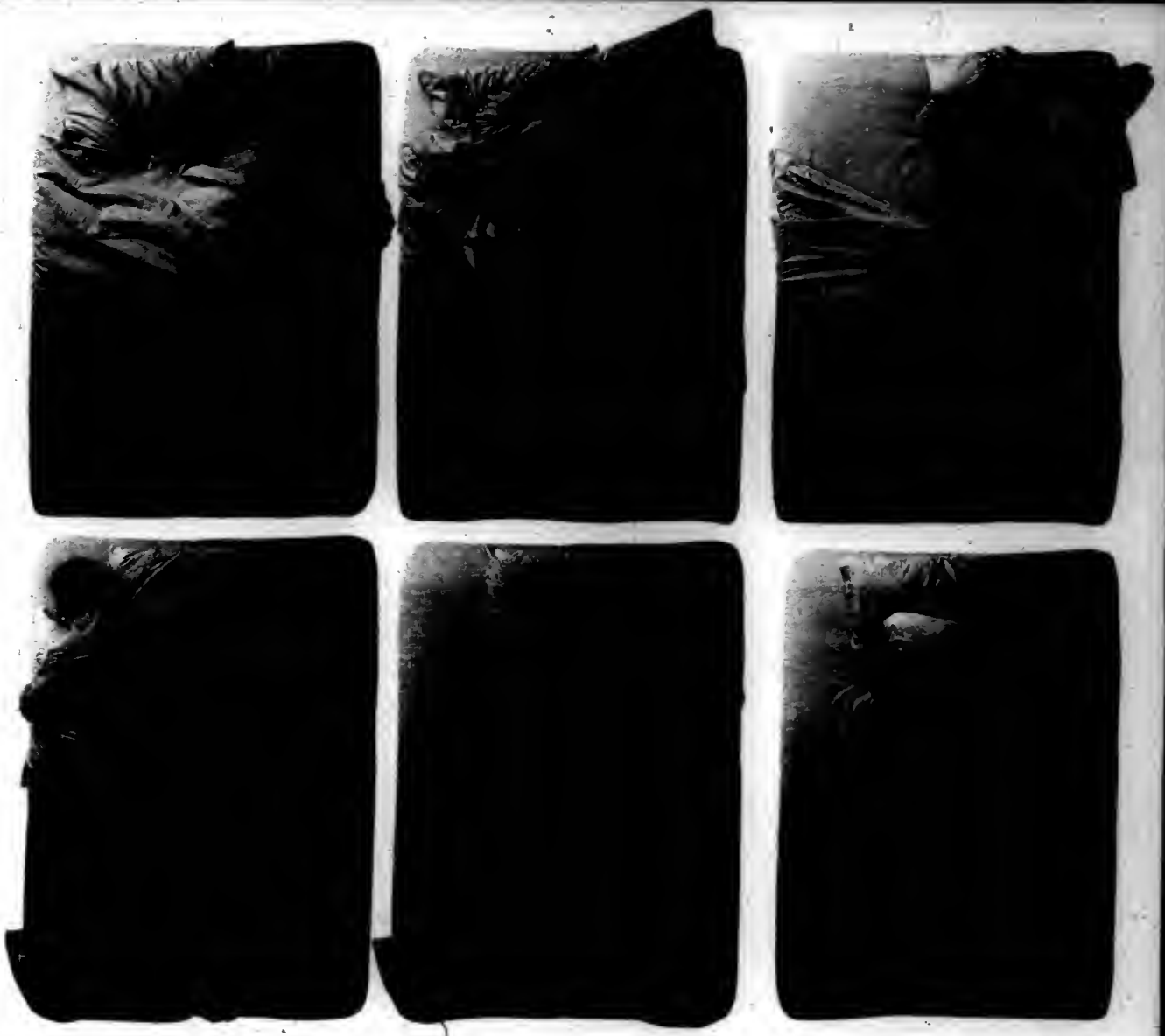


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INDUSTRY INSIGHT

Charles Varga

Dangerous liaisons



Several relatively disconnected but nonetheless related recent events serve to focus attention on the subject of foreign ownership of the U.S. industrial base, raising some disturbing questions in the process.

Here are some of the events:

- The U.S. government released a list of 22 technologies deemed critical to national security — almost all of which have some information technology component.
- A retired senior military computer security expert, commenting on fallout resulting from the Internet virus affair, said that "the potential for offensive use of viruses is so great that I would have to view the power and magnitude as comparable with that of nuclear or chemical weapons."
- A debate is under way over whether the U.S. government should release R-16 fighter jet software, including the source code of the plane's mission computer, to the Japanese for use in their FSX jet fighter program.

What these events say to me is that for the first time, people

Continued on page 80

Will merger scramble Novell game plan?

ANALYSIS

BY PATRICIA KEEFE
CW STAFF

PROVO, Utah — The pending merger announced last month between Novell, Inc., a network software vendor, and Excelan, Inc., a supplier of communications protocols, has raised questions about Novell's off-again, on-again commitment to hardware sales [CW, March 27].

Analysts also questioned how Excelan's focus on penetrating the low end will mesh with Novell's efforts to build bigger, more sophisticated networks. Then there are management issues. Novell is perceived in some quarters to be a one-man show, that man being Chairman Raymond Noorda, while Excelan has endured some turmoil and turnover at the executive level.

In the last six months, Novell first denied, hedged and then admitted to efforts to distance itself from the hardware business. That strategy forced Novell to take a $10 million write-down in its fourth quarter and also stunted its most recent earnings report.

About-face strategy

Asked about the seeming about-face in strategy, Noorda insisted that Novell has backed away only from commodity hardware and defended Excelan's line of intelligent adapters. "Give me a break," one skeptical analyst responded.

How Novell will reconcile Excelan's hardware with its own stated strategic intent to focus primarily on software, such as its Netware network operating system, is unclear.

One former Excelan employee suggested Novell may downsize Excelan, selling off some or all of its hardware business. If so, Mary McCaffery, an analyst at C.J. Lawrence in New York, said she wants to know whether Novell would take another write-down. "That's why the stock is down," she said.

Any effort to spin off Excelan's hardware will be complicated by two factors, the former employee said. Excelan's hardware is closely coupled with its software and also accounts for more than 50% of the company's revenue. Conversely, Novell has espoused a philosophy of hardware independence. About 35% of its revenue is derived from hardware.

It is generally agreed that Excelan will provide Novell with much-needed support for protocol standards vital to competing for corporate accounts. "Excelan's experience [in this area] is going to be key," said Cecilia Brancato, an analyst at Oppenheimer & Co. in New York.

Users will benefit further if Excelan's technical expertise helps Novell bring products to market faster. In addition, Novell gains both additional revenue and an experienced research and development force, Brancato said.

Cause for concern

In addition, Excelan's license for Microsoft Corp.'s OS/2 LAN Manager has rival 3Com Corp. more than a little concerned, another analyst said.

"It will cause them to rethink what they've got to this point, and they'll probably look to see what they'll have to do to speed things up to catch up with Novell," the analyst said.

3Com Chairman William Krause said, "We've always maintained that Novell would go through three phases with the concept of an OS/2 server [LAN Manager]: denial, acknowledg-

Continued on page 80

Much to gain

Novell stands to substantially strengthen its protocol portfolio through its pending purchase of Excelan

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[1] Unix ports of Netware are under development and have been announced
[2] Novell recently signed an agreement with Sun to develop similar expertise

CW CHART: FRANK C. O'CONNELL

ADAPSO leader resigns

Organization to maintain strategic status quo

BY NELL MARGOLIS
CW STAFF

For the second time in two years, ADAPSO has unexpected room at the top. However, the mid-March departure of George T. DeBakey from the office he has held since 1987 in no way alters the strategic direction of the computer software and services industry association, according to remaining ADAPSO leaders.

"The direction we're going in doesn't have much to do with the executive director," said ADAPSO's head of long-range planning, Richard L. Crandall. "It's likely to be more the other way around."

That direction, Crandall said, is one of "a certain amount of decentralization" in the interest of making the expanding association's sections more responsive to their respective constituencies. Increasing the size of the ADAPSO staff has also moved up in priority on the organization's agenda, he said.

Several industry sources say the appearance of a revolving door at ADAPSO is largely coincidental. DeBakey's predecessor, Jerome Dreyer, abruptly

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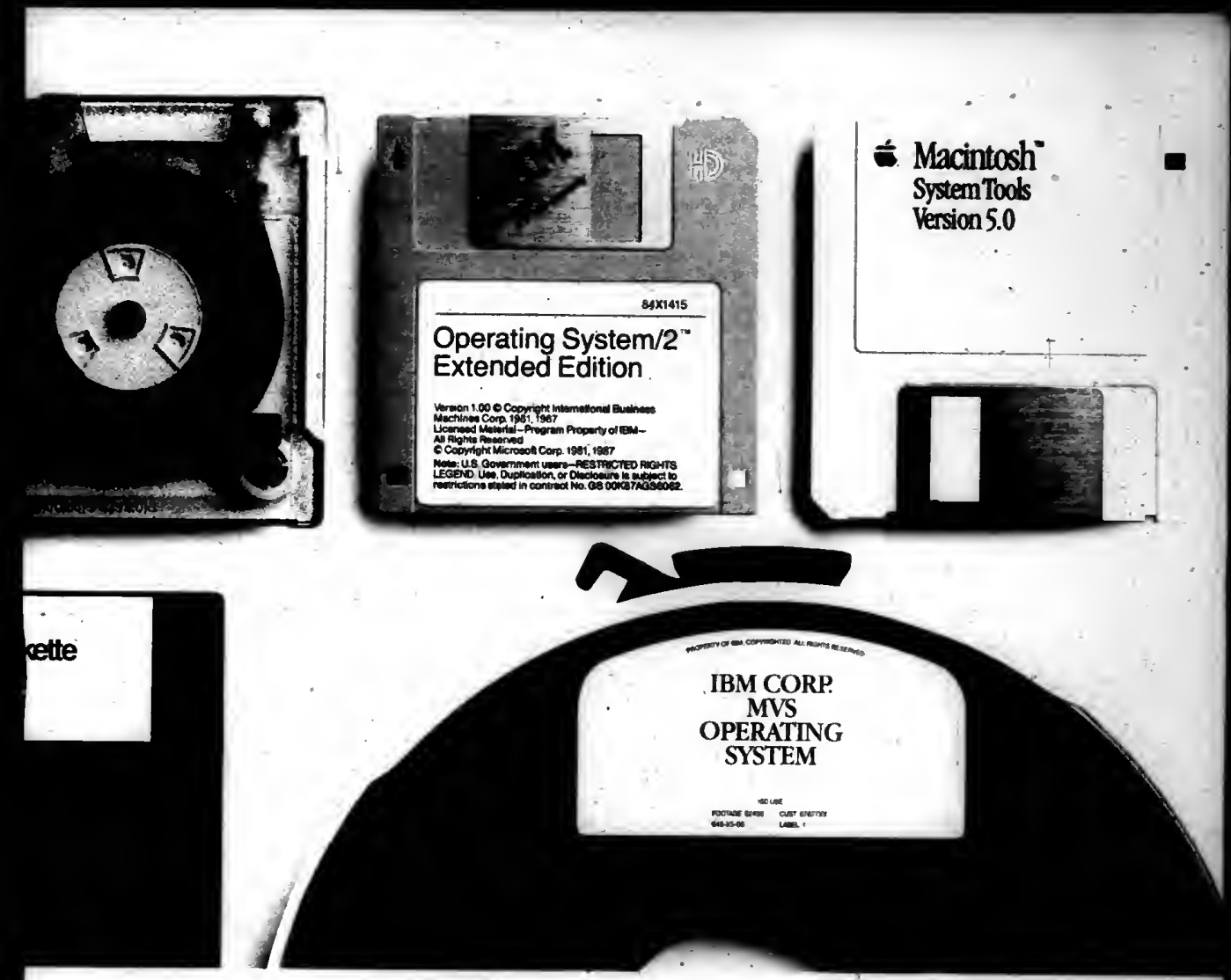
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Novell

CONTINUED FROM PAGE 77

ment and then adoption."

Krause said the proposed merger took 3Com by surprise. "Novell has been profusely expressing a desire to divest itself of hardware to become a software company. This seems to be a major change in strategy," he said.

Microsoft officials were to have met with Excelan last week to discuss the license. "The language of the contract could prevent certain information from flowing to Novell," McCaffery said.

Moreover, working with Novell could cost Excelan its OEM relationship with Microsoft. Microsoft may replace Excelan's Transmission Control Protocol/Internet Protocol port for LAN Manager with a competitive product, Krause said.

Further fallout from the merger could damage Novell's relationship with neighbor and Macintosh connectivity development partner Dayna Communications, Inc. Noorda conceded that responsibility for Novell's Netware for Macintosh software will be shifted over time to Excelan's Kinetics subsidiary, which manufactures connectivity products for Apple Computer, Inc. networks. "It's the natural thing to do," he said.

Despite 3Com's alleged surprise, Novell and Excelan maintain that a merger was inevitable. Excelan tried unsuccessfully to merge with Network Equipment Technologies, Inc. last year. The buyout fell apart after key Excelan shareholders rejected NET's offer of $13 per share. Novell soothed shareholders by offering a little more than $18 per share, a premium of about 45% over the stock's closing price at the time of the offer of about $13, analysts said. "We wanted to make sure this went through," Noorda said.

The terms of the agreement require certain Excelan stockholders, including each of its directors, to agree to vote their shares in favor of the merger. The existing shares of Excelan common stock will be exchanged for newly issued shares of Novell common stock, with Excelan stockholders receiving a minimum of 0.475 and a maximum of 0.6 shares of Novell common stock. The merger will be accounted for as a pooling of interests.

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Varga

CONTINUED FROM PAGE 77

are paying attention and putting their money where their mouths are to protect militarily critical and commercially valuable information assets from being acquired in one form or another. One of the currently prevalent routes out the door for such assets is foreign acquisition of U.S. technology companies.

As most advancing countries move from manufacturing industries and material-based production to knowledge-based production, an equation must be brought into balance. If we are to maintain our lead in U.S.-based information technology, the equation should read: economic security equals information security equals international security.

Computer scientists say that economists do not understand the role of technology in the economic system, particularly technologies that have a cumulative effect and a dual use, in that they serve existing markets but also serve as a basis for developing the next generation.

On the other hand, there are those who would rather foster a globalization of information technology markets, a totally free system of international trade and strategic alliances across many borders.

While market globalization is a general trend, mergers and acquisitions in computer software, services and information processing companies have been clearly cyclical, peaking in years when there was severe weakening of the U.S. dollar against foreign currencies and ebbing when the dollar was too rich.

Who benefits?

But who really benefits when the quest of international companies for growth and diversification through increasingly accessible U.S. markets leads to foreign ownership of information technology companies?

Some business owners and shareholders have opted for short-term profit now rather than holding out for long-term growth. Many of these it's-a-done-deal, deal-a-minute types beat the drum for globalization and free trade while their immediate thoughts are of the fast buck.

For managers and employees, the prospects are dim. Just as certain microelectronics industry jobs were deemed environmentally or economically unsuitable for domestic operations but fit for offshore sites, so, too, can skilled programming move offshore. Companies based in India can now produce code at a fraction of the cost of U.S. production. The writing is on the wall.

I have seen five kinds of people in the computer industry: those who write code, those who read code, those who make code, those who break code and those who steal code. Actually, there are six. There are those who buy and sell code.

Capital inflow from foreign sources is welcome and necessary. But we must negotiate agreements that protect U.S. interests. An old saying asks, why buy a cow when you only need a quart of milk? My question is, if you sell the cow, where do you go for the quart of milk when you need it? And how much do you have to pay — if you can get it?

Varga, a 20-year computer industry veteran based in Frenchtown, N.J., is publisher of "The Cerberus Report," a study of industry mergers and acquisitions.



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IN BRIEF

Up, up and away

Oracle Corp.'s third-quarter financial report came out last week and does nothing to discourage those who think that "high-flying" is the Belmont, Calif.-based database management system vendor's first name. Chief Executive Officer Lawrence Ellison credited the quick takeoff of new applications packages as a major factor fueling the company's 101% revenue rise to $153.4 million and 84% earnings increase to $24 million over last year's comparable period.

.....

Up, up and away, Part II

Networking systems player 3Com Corp. has broken the $100 million barrier in quarterly sales. The company's $107 million third-quarter revenue total marked a 62% increase over last year's third quarter. Quarterly net income also rose 62%, coming in at $11 million.

.....

Tea for three

Three long-time IBM executives are new vice-presidents of the company. Systems Technology Division President Robert Corrigan, IBM Educational Systems General Manager James Desell Jr., and Harry Kavetas, president of IBM Credit Corp., will continue at their current posts.

.....

Hard times

National Semiconductor Corp. last week announced plans to close its Danbury, Conn., manufacturing facility this coming February in an effort to match costs to current business levels.

.....

Bleak house

Already battling recent losses and a slew of shareholder suits, Longmont, Colo.-based Miniscribe Corp. last week announced a financial review undertaken in the wake of new management's decision to curtail or end certain programs and to accept certain products back from distributors claiming excess inventory.

ADAPSO

FROM PAGE 77

resigned his office for personal reasons, said Sam Albert, vice-president of Mountain View, Calif.-based market research firm Input, which is an ADAPSO member.

DeBakey's departure, in turn, resulted from the growing divergence between ADAPSO's priorities and DeBakey's own, according to John Imlay, vice-president of image and public communications at ADAPSO.

DeBakey, former assistant secretary for science and electronics at the U.S. Department of Commerce, was brought in from the federal government sector to increase ADAPSO's visibility and public policy participation in that area — a mission that he accomplished, Imlay said.

In fact, he noted, "I think George became frustrated. He really wants to focus on the international trade arena, and ADAPSO has a great many interests to serve."

DeBakey has voiced his intent to pursue opportunities in international trade and high technology.

His successor at ADAPSO has not been named. However, Crandall said, "we have a slate of outstanding candidates we're considering." He predicted that the announcement of the new executive director would not be long in coming.

Manning the post in the meantime is Richard Earnest, former president of Reston, Va.-based Systems Center, Inc.

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Are job fairs worthwhile?

Scrutinize the sponsors and prepare to seize opportunities

BY JANET RUHL
SPECIAL TO CW



"Job fairs are a total waste of time," one MIS professional says. "Nonsense, I got my last job at one," another claims.

Whether or not you will find an MIS job fair useful in landing a new job depends on your understanding of how one works and how you should prepare for it.

Before you decide to go to a fair, spend some time determining who is sponsoring it and what kind of company representatives will be attending.

Some job fairs are sponsored by a single company that is hoping to fill a large number of open jobs — an MIS open house. Some company-run fairs feature booths manned by managers from every department that is looking for staff. Here, if you are interested in a position, you may be able to interview on the spot with someone who has the authority to hire you.

Because a large number of hiring managers attend, it is possible to find out a great deal about the firm's systems — what technologies are most in demand, what pilot projects are under way and what kinds of people succeed in the firm.

A different sort of MIS job fair is sponsored by a vendor that makes money running the fairs. Usually held at a hotel, these fairs feature from 20 to 100 booths, each with one or two representatives from a company. They may be MIS managers or personnel department staffers. Because one or two of them must represent all the open jobs in the company, they may not be able to provide you with details on projects or what exact skills the company is seeking.

However, these vendor-sponsored fairs often include representatives of out-of-town companies that local systems professionals may not realize are hiring.

Lining up its ducks

Most fair attendees agree that the least satisfying gatherings are ones where the majority of hiring companies are recruiters and contract programming houses. These companies may not have any jobs to fill and are merely keeping track of potentially available workers. Since most job fairs advertise the names of the firms that will be attending, scrutinizing the mix might save you wasted time.

Whether you will accomplish more by going to a job fair than mailing your resume to personnel departments depends on the skills of the representatives you meet. Their technical expertise, knowledge about their company and interviewing skills vary widely.

Too often, companies choose representatives for the wrong reasons: because nothing important was going on in the person's area that week or because he was attending a meeting in the same city.

> THE BIGGEST MISTAKE technical people make with job fairs is to approach them in the same spirit with which they attend trade fairs — shopping around to see if anything new and interesting is on display.

Your best strategy is to expect little but prepare to take advantage of the occasional chance that you will meet a communicative and knowledgeable representative. Remember that no matter what the representative you speak with is like, he may pass on your resume to someone who will get excited about it.

The biggest mistake technical people make with job fairs is to approach them in the same spirit with which they attend trade fairs — shopping around to see if anything new and interesting is on display. Hiring managers often interpret this vagueness as a sign that the applicant does not know what he wants or what he is qualified for and that he is not psychologically ready for a new job.

Keep in mind that the purpose of the firms paying for the job fair is not to sell their organization to potential employees but to find as many qualified prospects as possible. Expect the emphasis not to be on answering your questions about the company but on answering the company's questions about you. Your best strategy, therefore, is to be very clear about what position you are looking for and the skills and experience that make you an attractive candidate for such a job. Emphasize them in your resume and in conversations with company representatives.

If you need help in determining what kind of focus would be most productive at the fair, look through recent issues of the classifieds for display ads placed by the attending companies. These ads almost always appear at least a week before data processing job fairs and describe the skills the company is looking for and what positions it is trying to fill.

Shape your resume so that it contains as many as possible of the technical qualifications that appear in the ads of the firms most likely to be interested in your past experience. Once at the fair, make every effort to talk at length with firms you have targeted.

While a prime complaint of fair attendees is that they do not get interviews, company representatives report that they try to spend time with potential hires. The greatest obstacle they report is timing: Most candidates show up at rush hour — from 4 p.m. to 6 p.m.— making it difficult to give any individual much attention. Attending at a less popular time may circumvent this problem.

Fancy meeting you here

If running into co-workers or your boss at a fair is a possibility and would be a disaster for you at your current job, stay home.

The slight edge you might get from talking face-to-face with a company representative is probably not worth the disruption that an unwanted confrontation could cause.

Instead, mail your resume to the personnel departments of the firms that interest you before the fair takes place, along with a note explaining that you are unable to attend but are interested in being interviewed.

Ruhl is a consultant programmer in Windsor, Conn., and author of *The Programmer's Survival Guide: Career Strategies for Computer Professionals.*

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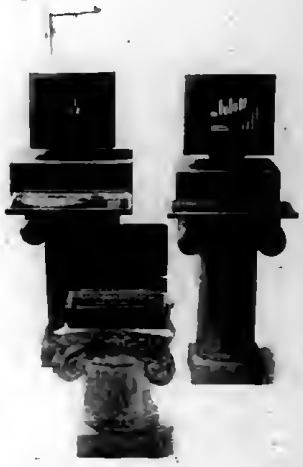
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MARKETPLACE

PC investments: Rent or buy?

Threat of technology obsolescence helps drive a rental boom

BY RICHARD PASTORE
CW STAFF

Why invest in PC purchases when the machines are likely to be obsolete in a couple of years?

That question is one that managers at small shops and Fortune 500 companies alike are asking. For many, the answer leads them to rent or lease short-term rather than buy personal computers.

The threat of technology obsolescence weighs heavily in this decision. "We find we can get rid of [outdated machines] easier that way," says Wayne Allen, data processing director at Entex, Inc., a Houston-based natural gas utility that leases approximately 200 microcomputers.

Cautious companies can audition new technology by renting first. "People may be renting machines both for evaluation purposes and to work with them until some of these technologies become more solidified," says Bruce Stephen, a PC analyst at International Data Corp. (IDC), a Framingham, Mass.-based market research firm.

There are several other situations in which renting a PC can be more appropriate than buying.

"If you're going into a city for a trade show, or if you're going to be at a client site for three or four weeks, it makes sense to rent," Stephen says. "Or if you're considering laptop computers and don't really know if they will be useful for you, you might want to give them a trial run by renting one for a month."

Weighing the costs

When the case for renting is less clear-cut, firms can defer to their accounting departments for financial counsel.

In deciding whether to lease or buy a computer, users should weigh considerations such as tax deductions for depreciation and interest, according to Ken Bouldin, president of the Computer Dealers and Lessors Association.

"Most companies have the capabilities within their accounting department to do that. It's the same argument as whether to lease or buy a Mercedes," Bouldin says. "Every business has got to do its own analysis of lease vs. buy to find out which is the most appropriate for them."

Renting is not always the best solution. Bouldin says a company with long-term needs can save money by buying if it can predict how long it will use the hardware, or if it has the capability to resell the equipment when ready to make a change.

If a business does opt to rent, it faces the choice of dealing with a direct or indirect rental source. In the direct approach, a company contacts a rental firm and orders a number of machines. The rental firm configures the units to the renter's specifications, delivers them to the intended location and installs them. The rental agent is then responsible for maintenance for the life of the contract.

With the indirect method, a customer actually buys the micros from the manufacturer or a value-added reseller. Then a rental agent steps in, buys the machines from the customer and rents them back to him. The rental agent shoulders the risk of the hardware's depreciation along with the burden of disposing of the units when they are no longer useful.

This indirect approach, though seemingly more complicated, lets the renter deal with his local vendor for the equipment purchase and support; the vendor will continue to support the PCs even after his client has sold them to the rental agent. Meanwhile, the rental agent remains in the background, according to Joe Kelly, president of Greenwich, Conn.-based Randolph Computer Corp., an indirect rental agent.

> "EVERY BUSINESS has got to do its own analysis of lease vs. buy to find out which is the most appropriate for them."
>
> KEN BOULDIN
> COMPUTER DEALERS AND LESSORS ASSOCIATION

Rental contract terms vary considerably. Random checks on monthly fees for IBM Personal Computer XT-type machines uncovered a range of $75 to $140. Fees for Apple Computer, Inc. Macintoshes varied from $200 to $799 per month. These prices include maintenance, but delivery and installation are usually extra — $20 on average for two or three units delivered within a 20-mile radius. Most rental firms offer volume discounts.

Obviously, it is wise to shop around. Savvy customers can exploit the fact that while rental demand is expanding about 18% annually, the number of rental firms is also multiplying — by as much as 50% in some areas.

"The demand is growing. However, the competition is growing even faster," says Jerzy Novosielski, general manager at Corporate Systems, Inc., a rental company in Cambridge, Mass. He acknowledges that this competitive crowding is pressuring prices downward — in his case, by about 20% in the last 12 months.

IDC's Stephen agrees. "The number — both independents and chains — getting into the business is certainly increasing," he says. With the market estimated to be as large as $250 million a year, even more rental firms will want to get in on the act — driving fees still lower, he adds. Clearly, it is becoming a renters' market.

Pasture is a *Computerworld* copy editor.

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The BoCoEx index on used computers

Closing prices report for the week ending March 24, 1989

	Closing price	Recent high	Recent low
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XT Model 086	$1,050	$1,150	$900
XT Model 089	$1,175	$1,575	$1,000
AT Model 099	$1,900	$2,000	$1,525
AT Model 239	$1,775	$2,100	$1,775
AT Model 339	$2,100	$2,375	$1,800
PS/2 Model 30	$1,375	$1,550	$1,000
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Portable 286	$1,700	$1,975	$1,675
Plus	$1,050	$1,250	$900
Deskpro 286	$2,100	$2,350	$1,800
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Apple Macintosh 512	$625	$775	$550
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Request for Proposal No. 1632, due Tuesday, April 18, 1989 at 3:30 p.m. for the acquisition of 15 80386-based microcomputers, 15 digitizers, 15 Autocad Version 10.1 planer and related peripherals for the Industrial Training Program at NORTHEAST MISSISSIPPI COMMUNITY COLLEGE.

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NEW YORK CITY HOUSING AUTHORITY
REQUEST FOR PROPOSAL

The New York City Housing Authority requests proposals for professional data processing services for Assistance with the Migration of Computer Applications from DOS/VSE to MVS/XA. Your firm must have a proven record of timely and cost effective DOS to MVS conversions with Fortune 500 companies and/or large government agencies.

If you can fulfill these requirements and provide the necessary experience, expertise and software, you are encouraged to obtain a copy of the RFP between 9:30 A.M. and 4:30 P.M. beginning Monday, April 3, 1989 from:

Paul Barker
Deputy Director S&CS
New York City Housing Authority
250 Broadway Room 1221
New York, New York 10007
(212) 306-3285

An indication of intent to respond must be received by April 12, 1989.

A Pre-Bidders Conference will be held on Friday, April 14, 1989 in the Authority's Ceremonial Room, Room 1010A at 2:00 P.M. All questions must be received no later than 5:00 P.M. on Thursday, April 13, 1989.

Proposals in response to the RFP must be returned to the above office no later than 5:00 P.M. on Thursday, April 27, 1989 to be considered.

New York City Transit Authority
Surface Transit
Request for Information
UNITED

The New York City Transit Authority (the "Authority") is seeking responses to identify experienced vendors interested in providing technical information for the use of interactive video technology in its bus operator training program. The Authority is requiring technical dimensions, program design, and estimated cost parameters, for information purposes only, on commercially available systems, as well as techniques for developing, designing, and producing customized lessons.

The Authority in interested in a multiple workstation (24+) system that would allow for flexibility in updating material, providing student management, determining student results and measuring training effectiveness. The Authority's goal is to have the system networked, possibly and/or potentially interfaced with the in-house Wang system and operated in a depot environment.

Interested firms are requested to submit a letter of interest, including detailed information about their experience and qualifications. Said letter must be received at the address indicated below not later than May 15, 1989. New York City Transit Authority, 25 Chapel Street Room 1008, Brooklyn, NY 11201. Attention: Kathleen Sanders.

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How we can invest in our own

DP organizations can play key role in fostering computer literacy in society

BY EDMOND DROUIN
SPECIAL TO CW

Studies continue to show a decline in math and science skills in the U.S. compared with other industrialized nations. This decline will hurt all U.S. business in the 1990s and into the 21st century.

Part of this problem's solution is to improve the quality of ongoing training for teachers. Another part is supplying support materials. The business community can, and should, begin to share in this effort.

In 1986, John Lampros, a programmer at Liberty Mutual Insurance Co., stopped in to see me in my capacity as the firm's director of data processing education. He explained that his wife Sharon, a high school math teacher, had been appointed to the position of computer instructor but had little computer background. He wondered if I would meet with her to help.

Before Sharon left my office, I lent her videotapes, film strips, computer periodicals and a copy of a computer-fundamentals text we use in classes.

Over the next few weeks, Sharon evaluated more material, and I ordered videotapes for her from a library firm. I found I could lend a lot of our own material, much of which was idle 75% of the time. I offered tours of our company computer operations and held classes on computer careers for groups of students.

Throughout that year, my approach was to be a helpful partner. An important point should be stressed here: Help of this nature should be defined by the recipient. Schools might understandably suspect corporate helpers of pursuing their own, perhaps hidden, agenda.

Building partnerships

During spring 1987, I became involved with an effort by the Portsmouth, N.H., Chamber of Commerce to improve partnerships between businesses and schools. Two of us on a committee proposed expanding my work to other schools.

We surveyed 26 high schools to identify needs and available resources. We also asked if computer teachers would benefit from a summer workshop.

We found teachers of computer classes possessed little background or training, encountered difficulties motivating some students and lacked both equipment and help from companies or outside individuals. There was support for the workshop, though many teachers were unsure of their precise needs.

We came to several conclusions that formed the foundation for our program. First, equipment needs were beyond our capacity, and besides, we believed citizens should fund the schools. There was also no way to bring about a compatible mix of equipment. We would have to work with the present diversity, though incompatible operating systems limited use of computer-based training.

TEACHERS OF computer classes possessed little background or training, encountered difficulties motivating some students and lacked both equipment and help from companies or outside individuals.

Teachers' training needs were considerable, and we could help to meet them in a variety of ways. This effort became the basic thrust of our program. Finally, some support materials could be provided to schools on generic computer issues such as basic concepts, security and careers.

We quickly found that many group members moved away from a commitment because of lack of time, money or skill. Our committee started with seven or eight company representatives, but when it came to doing work and funding the effort, only two were left. Data General Corp. contributed money to fund a lending library of support materials.

I met with my training staff to discuss the project, and several members agreed to design and teach modules. I offered each a pair of half-days off — modest rewards in a tight system. I believe people worked on the program because they cared about the teachers and about sharing knowledge and skills.

In addition, my superior, the manager of DP administration, agreed to let us use company classrooms and equipment. He also agreed to hire Sharon Lampros on a part-time, temporary basis to help us develop the resource library and the teacher-training program.

We decided teachers should learn more about how computers are used to show students types of jobs and skills they would need. I arranged for organizations such as Portsmouth Regional Hospital and Pease Air Force Base to provide tours and explain their use of computers.

We conducted the 4½-day workshop during August for 18 teachers from 13 districts. Mornings were devoted to discussions and hands-on practice. The tours took place in the afternoons, with the host providing lunches.

There was no cost to teachers or their school districts, except for those teachers who gave up a week of summer employment. We provided teachers with certificates of completion that helped satisfy development requirements in their districts.

The workshop covered computer concepts such as databases, including hands-on use of IBM's DB2 and SQL; electronic mail, with use of two leading systems; networking; personal computers; expert systems and decision-support systems; design and construction of computers; legal implications of PC software; and future trends.

In spring 1988, members of the New Hampshire High-Tech Council contacted me about expanding the project. A meeting led to a second workshop last August for 22 teachers.

This idea of computer professionals assisting school systems has only begun to move through society, but the potential for DP professionals to help is real.

We are not merely hidden hackers in a quiet corner of society. With our education and prosperity, we enjoy the benefits of our society. Let us share our knowledge and experience with others. Full membership in society means not only taking but sharing.

Drouin is director of DP Education & Training at Liberty Mutual Insurance Co. in Portsmouth, N.H.

Computerworld

Training Editorial Schedule

April 3 -	DP Training Organizations & the Public School Market.
April 10 -	Developing an Automated Management System
April 17 -	Evaluating Training Vendors.
April 24	Preparing the RFP for Training Services.
May 1	Training the Experienced with a New Environment
May 8	Assessing Training Needs Based on Changes in Technology and the Workforce



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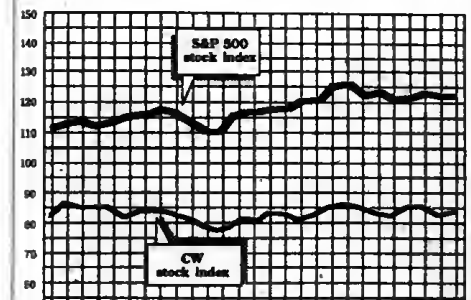
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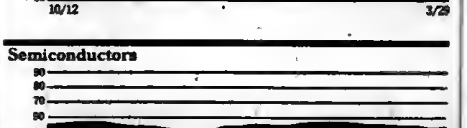
Computer Systems



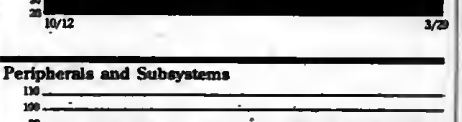
Software and DP Services



Semiconductors



Peripherals and Subsystems



Leasing Companies



Computerworld Stock Trading Summary

CLOSING PRICES WEDNESDAY, MARCH 29, 1989

E X N M		52-WEEK RANGE (1)	PRICE CLOSE MARCH 29, 1989	WEEK NET CHANGE	WEEK PCT CHANGE

Communications and Network Services

N	AMERICAN INFO TECHS CORP	53	42	50.75	-1.0	-1.9
Q	ANDREW CORP	22	13	16	-0.3	-3.8
Q	ARTEL COMM CORP	4	1	6	0.1	4.3
N	AT&T	33	24	31.25	-0.3	-0.9
Q	AVANT GARDE COMP INC	3	0	0.5	-0.1	-20.0
Q	AVANTEK INC	8	5	5.25	0.3	6.0
N	AYDIN CORP	17	13	15.5	0.0	0.0
N	BELL ATLANTIC CORP	75	64	73.75	0.5	0.7
N	BELL SOUTH CORP	44	37	42	0.4	0.9
Q	COMPRESSION LABS INC	9	6	4.75	0.0	0.0
Q	COMPUTER NETWORK TECH	3	1	1.532	0.0	-2.0
Q	CONTEL CORP	51	31	50.25	1.0	2.0
Q	DATA SWITCH CORP	8	5	8.125	0.1	2.5
Q	DIGITAL COMM ASSOC	29	17	18.625	-0.1	-0.7
Q	DYNATECH CORP	24	17	18.25	0.0	0.0
Q	FIBRONICS INTERNATIONAL INC	5	6	4.375	0.1	2.9
Q	GANDALF TECHNOLOGIES	5	3	2.875	-0.5	-11.4
Q	GENERAL DATACOMM INDS	5	3	5.5	0.1	2.3
N	GTE CORP	48	34	45.375	-0.5	-1.4
Q	INFOTRON SYS CORP	14	9	10	0.9	9.9
N	ITT CORP	58	44	51.75	0.3	1.5
N	M A COM INC	11	6	7.625	0.0	0.0
Q	MCI COMMUNICATIONS CORP	29	11	28.875	2.5	9.5
Q	NETWORK EQUIPMENT TECH INC	22	14	20.5	0.3	2.8
Q	NETWORK SYS CORP	12	8	9.75	-0.4	-3.7
N	NORTHERN TELECOM LTD	20	15	14.375	-0.3	-1.7
Q	NOVELL INC	38	15	30.125	-1.1	-3.8
N	NYNEX CORP	71	61	69.625	-3.4	-0.5
N	PACIFIC TELESIS GROUP	38	27	34.875	0.3	0.7
A	PENRIL CORP	5	4	4.25	-0.3	-5.6
N	PLESSEY PLC	48	25	43.125	-0.4	-0.9
N	SCIENTIFIC ATLANTA INC	15	10	14.625	0.3	1.7
N	SOUTHWESTERN BELL CORP	48	34	48	0.8	1.6
Q	3 COM CORP	28	18	26.25	1.1	4.8
N	U S WEST INC	63	50	62.5	1.5	2.5

Computer Systems

Q	ALLIANT COMPUTER SYS	8	3	3.25	-0.1	-3.7
Q	ALPHA MICROSYSTEMS	8	4	6.75	-0.5	-6.8
Q	ALTOS COMPUTER SYS	11	6	8.75	0.8	10.2
A	AMDAHL CORP	28	15	17	0.3	1.5
Q	APOLLO COMPUTER INC	17	7	7.75	-0.1	-1.9
N	APPLE COMPUTER INC	48	34	34.25	0.1	0.3
N	BOLT BERANEK & NEWMAN	19	9	9.375	0.9	2.7
Q	BRITTON LEE INC	4	3	2.813	-0.1	-2.2
N	COMPAQ COMPUTER CORP	75	47	69.75	1.9	2.4
Q	COMPUTER AUTOMATION INC	10	3	4.5	-0.1	-2.7
Q	CONCURRENT COMP CORP	9	4	4.75	-0.3	-5.0
N	CONTROL DATA CORP	28	15	20.625	0.3	1.2
Q	CONVEX COMPUTER CORP	11	7	9.75	0.9	2.9
N	CRAY RESH INC	58	53	54.75	-1.0	-1.8
Q	DAISY SYS CORP	12	4	4.25	0.1	3.0
N	DATA GEN CORP	25	15	15.375	0.6	1.7
N	DATAPOINT CORP	5	4	3.5	-0.3	-8.7
Q	DELL COMPUTER CORP	13	7	7.125	0.3	3.6
N	DIGITAL EQUIP CORP	122	85	99	2.6	2.7
N	FLOATING POINT SYS INC	5	3	2.75	0.1	4.8
N	HARRIS CORP	32	25	27.75	-0.1	-0.4
N	HEWLETT PACKARD CO	65	44	50.75	-1.3	-3.4
N	HONEYWELL INC	77	57	65.125	0.3	1.3
N	IBM	131	105	109.625	0.4	0.9
Q	INFORMATION INTL INC	15	13	13	-0.4	-2.4
Q	IPL SYS INC	7	1	5	-0.1	-2.0
N	MAI BASIC FOUR INC	21	7	6.125	0.1	8.0
N	MATSUSHITA ELEC INDL LTD	319	180	184.75	-2.3	-1.2
Q	MEGADATA CORP	4	1	1.344	0.0	2.4
Q	MENTOR GRAPHICS CORP	37	22	31	0.3	0.9
N	MSI INC	7	1	1.8	0.0	0.0
N	NCR CORP	70	51	55.75	1.8	3.2
N	PRIME COMPUTER INC	31	13	16.625	-0.5	-1.3
Q	PYRAMID TECHNOLOGY	20	10	13.5	0.3	1.9
Q	SILICON GRAPHICS CORP	22	14	15	-0.3	-1.9
Q	STRATUS COMPUTER	32	21	26.5	1.3	5.0
Q	SUN MICROSYSTEM INC	31	13	15.375	-0.5	-3.1
Q	SYMBOLICS INC	3	1	3	0.1	3.2
Q	SEQUENT COMPUTER SYS INC	27	14	23.5	0.9	1.9
N	TANDEM COMPUTERS INC	21	12	17.625	-0.1	-0.7
N	TANDY CORP	49	38	42.625	0.3	0.3
N	ULTIMATE CORP	16	8	9.875	0.3	0.0
N	UNISYS CORP	28	20	25.75	0.0	0.0
A	WANG LABS INC	16	9	8.375	0.0	0.3

Software & DP Services

Q	ADVANCED COMP TECH	4	1	2.75	-0.5	-15.4
Q	AMERICAN MGMT SYS INC	19	13	14.625	-0.5	-3.3
Q	AMERICAN SOFTWARE INC	31	12	19.875	0.6	3.2
N	AMACOMP INC	12	5	6.125	0.1	2.1
Q	ANALYSTS INTL CORP	16	7	17	1.3	7.9
Q	ASK COMPUTER SYS	20	10	19.75	0.3	1.3
Q	ASK COMPUTER SYS INC	16	12	14	-0.5	-3.4
Q	AUTODESK INC	34	23	29.25	1.9	6.4
N	AUTO DATA PROCESSING	48	38	39.375	0.3	0.7
Q	BMC SOFTWARE INC	17	8	10	-0.3	-2.8
Q	BOOLE & BABBAGE INC	18	8	15.5	0.3	2.3
N	BUSINESSLAND INC	16	8	11.375	0.3	2.5
N	COMPUTER ASSOC INTL INC	40	24	24.75	-0.3	-0.7
Q	COMPUTER HORIZONS CORP	12	7	8.125	-0.1	-1.9
N	COMPUTER SCIENCES CORP	59	38	48.125	0.1	0.3
Q	CORPORATE SOFTWARE	15	6	6	0.0	0.0
B	COMPUTER TASK GROUP INC	17	10	14.375	-1.0	-6.5
Q	COSMOS INC	8	6	7.375	0.5	7.3
Q	COMSHARE INC	29	16	26.25	1.9	9.3
N	CULLINET SOFTWARE INC	9	4	9	-0.1	-3.4
N	GENERAL MTRS (CLS E)	47	37	43	0.0	0.0
Q	HOGAN SYS INC	8	3	8	0.4	6.1
Q	INFORMIX CORP	29	7	10.625	-0.4	-3.4
Q	INTELLICORP INC	4	2	3.625	-0.1	-3.3
Q	KEANE INC	33	6	31	3.0	10.7
Q	LEGENT CORP	24	18	21.75	0.3	0.0
Q	LOTUS DEV CORP	39	18	20.25	-0.5	-2.4
Q	MANAGEMENT SCI AMER	14	5	6.75	1.5	11.4
Q	MICRO PRO INTL CORP	4	3	1.813	-0.1	-3.4
Q	MICROSOFT CORP	71	45	49.5	0.5	1.0
Q	MORINO ASSOCIATES INC	20	13	20	0.3	0.0
Q	NATIONAL DATA CORP	30	19	26.625	-3.4	-1.4
N	ON LINE SOFTWARE INTL INC	11	4	9	0.6	6.7
Q	ORACLE SYS CORP	28	16	24.375	2.1	9.5
N	ORACLE SYS INC	16	12	15.25	1.0	6.9
Q	PHOENIX TECHNOLOGIES INC	19	13	19	0.9	1.9
Q	POLICY MGMT SYS CORP	27	21	22.25	0.0	0.3
Q	PROGRAMMING & SYS INC	18	10	17	0.0	0.0
Q	RABBIT SOFTWARE INC	6	2	1.75	-0.1	-6.7
Q	RELATIONAL TECHNOLOGY INC	21	12	13	-0.4	-3.6
N	REYNOLDS & REYNOLDS CO	38	17	27.125	1.1	4.3
Q	SEI CORP	22	15	16.625	-0.1	-0.7
Q	SHARED MED SYS CORP	28	14	15	-0.1	-0.7
Q	SAGE SOFTWARE INC	15	5	8.625	-0.3	-2.8
Q	SOFTWARE PUBG CORP	27	14	17.125	0.6	2.6
A	STERLING SOFTWARE INC	9	5	6.125	0.6	6.3
Q	SUNGARD DATA SYS INC	20	13	13.25	-0.5	-3.6
Q	SYSTEMATICS INC	37	28	34.25	0.0	0.0
N	SYSTEM CENTER INC	21	13	18.375	-1.4	-8.3
N	SYS. SOFT INC	38	9	20.25	1.0	5.2

Semiconductors

N	ADV MICRO DEVICES INC	17	7	8.25	0.3	3.1
N	ANALOG DEVICES INC	19	10	10.5	0.3	0.0
Q	ANALOGIC CORP	10	5	9	-0.1	-1.4
Q	CHIPS & TECHNOLOGIES INC	31	11	16	0.3	1.9
N	INTEL CORP	37	16	24.5	1.1	4.8
Q	LSI LOGIC CORP	14	8	8.75	-0.1	-1.3
Q	MICRON TECHNOLOGY INC	28	15	18.75	1.1	6.4
N	MOTOROLA INC	56	36	40.875	1.0	2.6
N	NATL SEMICONDUCTOR	19	7	7.5	-0.1	-1.3
N	TEXAS INSTRS INC	38	29	36.25	1.0	2.9
A	WESTERN DIGITAL CORP	17	11	11.375	-0.3	-4.2

Peripherals

Q	ALLOY COMP	6	3	2.125	-0.1	-2.3
N	AM INTL INC	5	3	3.625	-0.1	-2.2
Q	AST RESH INC	17	7	8.375	0.0	0.3
Q	AUTO TROL TECH CORP	6	4	5.25	0.1	2.4
Q	BANCTEC INC	13	9	11.625	1.0	9.4
Q	CIPHER DATA PRODS INC	11	5	6.75	0.8	6.1
Q	COGNITRONICS CORP	5	3	4	0.0	0.0
Q	CONNOR PERIPHERALS	10	7	8.625	-0.3	-3.8
Q	DATAPRODUCTS CORP	16	9	17	0.3	1.9
A	DATARAM CORP	5	5	5	0.3	4.8
N	EASTMAN KODAK CO	50	38	48.125	-0.1	-0.5
Q	E M C CORP MASS	15	4	3.75	-0.3	-8.3
Q	EMULEX CORP	12	6	8.625	0.3	3.8
Q	EVANS & SUTHERLAND	21	13	17.25	0.9	4.5
Q	IDOT CORP	8	6	8.25	-0.1	-1.5
Q	INTERLEAF INC	20	9	9.25	1.1	13.8
Q	IOMEGA CORP	8	0	2.063	0.1	6.4
Q	LEE DATA CORP	4	3	3.563	0.1	2.9
Q	MAGSTOR SYS CORP	4	0	2.125	-0.3	-10.5
Q	MAXTOR CORP	10	6	8.625	0.6	7.9
Q	MICROPOLIS CORP	28	9	9.25	0.0	0.0
N	MINISCRIBE CORP	14	6	3.688	-0.5	-4.1
N	MINNESOTA MNG & MFG CO	70	57	67.25	-0.5	-0.3
Q	PERSONAL COMPUTER PRODUCTS INC	7	4	4.25	-0.3	-5.6
Q	PRIAM CORP	3	1	1.125	0.2	19.9
Q	PRINTRONIX INC	11	7	7	0.3	3.7
N	QMS INC	12	6	8.25	-0.1	-1.5
Q	QUANTUM CORP	17	10	16	0.9	1.9
N	RECOGNITION EQUIP INC	12	8	8.75	-0.5	-6.1
Q	REXON INC	8	4	7	0.1	1.3
N	SEAGATE TECHNOLOGY	23	7	11.375	0.9	8.3
N	STORAGE TECH CORP	4	1	3	-0.1	-3.5
Q	TANDON CORP	3	1	0.875	-0.2	-17.7
N	TEKTRONIX INC	38	18	20.75	-0.5	-2.4
Q	TELEVIDEO SYS INC	1	0	0.375	0.0	9.0
N	XEROX CORP	67	38	68.75	-1.0	-1.7

Leasing Companies

Q	AMRESCON INC	30	13	17.75	-0.5	-2.7
N	CAPITAL ASSOCIATES INTERNATIONAL INC	5	4	5.875	0.3	7.9
N	COMDISCO INC	28	19	22	0.3	1.1
Q	CONTINENTAL INFO SYS	9	0	0.875	0.3	27.3
Q	LDI CORPORATION	17	10	16.25	-0.3	-1.9
Q	PHOENIX AMERN INC	9	3	3.25	-0.1	-3.7
Q	SELECTERM INC	9	4	7.5	0.3	7.1

EXCH: N—NEW YORK; A—AMERICAN; Q—NATIONAL

No fooling

Unusual calm greets the latest Street shock from a tech giant

Those who say Wall Street is populated by nobody but cynics may be far too cynical.

In the wake of the stock devastation wrought by warnings from IBM and Digital Equipment Corp. of lower-than-expected earnings, something more than a blip might have been anticipated after Unisys Corp.'s startling announcement last week that a predicted first-quarter loss could run as high as $80 million.

But the company attributed its current woes to one-time-only causes, and Wall Street believed. Unisys stock ended the week at 26 points, up ½ of a point.

The lamb-like late March mood extended to DEC as well. Its stock began the long climb back to the three-figure level to which it had grown accustomed, picking up ⅛ of a point for a Thursday close of 98¼. IBM stock started out on a similar path at the week's start but dropped back to a Thursday close of 108¼, down 1¼ points.

Teradata Corp. also received the the benefit of the doubt from investors; its stock slipped after a low-earnings warning, but by Thursday it showed a 1⅛-point rebound, closing at 14⅛.

NELL MARGOLIS

Strong scruples can curb computer crime

BY MICHAEL ALEXANDER
CW STAFF

BOSTON — The nation's laws governing computer crimes are strong, but its ethics concerning the use of computer technology are weak, according to Larry Potts, chief of the white-collar crimes program at the Federal Bureau of Investigation.

Computers that are easier to use, their widespread accessibility and the population's growing literacy have "fueled the fire of computer-related crimes," said Potts in a keynote address before an audience of more than 300 information security professionals at the Sixth Annual Working Conference for Information Security Professionals held here last week.



STELLA JOHNSON

FBI's Potts *thinks it's time to get tough*

According to Potts, existing laws governing white-collar and computer-related crimes are adequate. "Most computer crimes are traditional crimes; instead of using a knife or gun in the attempt, the criminal uses a computer. What is needed is a reinforcement of ethics," he said.

Too many citizens believe that computer crimes are victimless and that illegally accessing a computer system causes little harm, Potts said. Yet, the same people would never dare to pop the lock off an office door and steal from their boss' desk drawers, he added.

The FBI's top white-collar crime investigator also called for greater cooperation between law enforcement and business in resolving computer crimes. Taking a common-sense approach to security will go a long way toward curbing computer crime, Potts said. As an example, he cited an instance in which a computer crime was committed after an employee left critical computer passwords and manuals in a trash receptacle outside of a company's computer room.

Potts told the audience that only by improving computer security can business expect to see a reduction in computer crimes. "Prosecution will never be a solution without computer security," he said. "It's like attacking the drug problem by attacking the supply side without addressing the demand side."

Computer crimes are not a technological problem but a people problem, Potts added.

Veiled threat

"There is no difference between the robber with a gun and the white-collar worker who breaches the public trust," said Scott Harshbarger, Middlesex County district attorney in Cambridge, Mass. "But the laws are not applied equally because corporate crime is hidden behind a sacred veil."

Harshbarger echoed the call for greater cooperation between law enforcement and business. The resources of local prosecutors are limited, he said. Business must be willing to define the nature of computer crime and to work with law enforcement officials to resolve crimes when they occur. Too often, corporations are reluctant to discuss computer crimes for fear of worrying their customers or suppliers, Harshbarger said.

Computer crime can be curbed only through education and the resultant change in people's behavior and attitudes. "You must play a lead in defining the ethical framework for the use of technology," he added.

Corporations are taking a more active approach in preaching computer ethics to their employees, said Raymond Humphrey, director of corporate security at Digital Equipment Corp. "Our jobs will get tougher before they get easier," Humphrey said. "Security will be a bigger problem because computer crimes will increase."

G-men don't need tech skills

Despite an alarming upsurge in computer crime, the FBI's white-collar-crime unit is not working on boosting its computer skills beyond a rudimentary level.

"There is some concern that the FBI lacks the expertise to investigate computer crimes and that its expertise is limited to watching *War Games* twice," said Larry Potts, chief of the FBI's white-collar-crime program.

"But the development of computer expertise is not a goal of the FBI," Potts said. "Our responsibility is to make evidence understandable to the layperson."

In a keynote address at the Sixth Annual Working Conference for Information Security Professionals in Boston last week, Potts discussed how the FBI handles computer crimes.

Prosecutors must prove their cases beyond a reasonable doubt — a task that is exceedingly difficult with computer crimes, the technical details of which most people find perplexing, Potts explained. When juries do not understand complex issues, defense attorneys seize on their confusion as a gambit to win cases.

Some security industry professionals said that computer crime is given a low priority by the FBI because there are many more compelling crimes that demand their attention.

"It's just not viewed as a serious problem," said Robert Campbell, president of Advance Information Management, Inc. in Woodbridge, Va.

Since 1976, 300 FBI agents have gone through a three-week training course to enhance their ability to investigate computer-related crimes. However, the course makes no attempt to educate them beyond the basics of computer science, Potts said. When computer crimes are beyond the agent's understanding, he is instructed to seek an expert's assistance.

The investigation of computer crimes falls under the jurisdiction of the the FBI's white-collar-crime program. This unit, the largest of the FBI's criminal programs, is responsible for investigating a wide range of white-collar crimes, which come under one of three categories: government fraud, corruption of public officials and financial crimes. Computer crime is a subsection of financial crimes. The entire white-collar-crime division has 1,500 agents who are handling 16,000 pending investigations, Potts said.

A new report by the National Center for Computer Crime Data, published last week, pegged the annual costs of computer crimes at $555,464,000, not including losses of personnel time and computer downtime as a result of computer abuse.

The number of cases pending investigation has gone from 75 in 1986 to "several thousand in 1988," according to Jay BloomBecker, director of the computer crime research center.

MICHAEL ALEXANDER

Cornell

CONTINUED FROM PAGE 1

rity weaknesses in Unix to launch his worm, in part because of ambivalent attitudes on the part of Unix vendors and developers.

The report said that commercial Unix vendors have been slow to fix well-known security flaws "because of the laborious procedures that are often followed." Other members of the Unix community are unwilling to point out security flaws for fear that such information would merely highlight the system's vulnerability, the commission added.

The worm, designed to infect computer systems running Unix, especially the University of California at Berkeley's Unix Version 4.3, had four methods of attack and several methods of defense that were intended to make it difficult to pinpoint and eradicate. It consisted of two parts: a 99-line "probe" written in the C language and a 3,568-line "corpus" that had been compiled into binary machine language. The probe attempted to penetrate a computer and, if successful, compiled and executed itself on the host and then sent for the corpus.

Although the worm was technically sophisticated, it contained several design flaws and programming errors and could have been created by many of the nation's undergraduate and graduate computer science students, the report said.

The commission concluded that Morris probably did not intend for the worm to replicate wildly. However, he reportedly "made only minimal efforts to halt the worm once it had propagated and did not inform any person in a position of responsibility as to the existence and content of the worm."

The worm's release was not "a heroic event that pointed up the weaknesses of operating systems," the report said. "The fact that Unix, in particular [the University of California at Berkeley's] Unix, has many security flaws has been well known."

The commission based its conclusions on evidence found in Morris' computer files and from interviews with computer faculty, computer center staff and graduate students at Cornell and staff and former students at Harvard University, where Morris was an undergraduate.

The commission claimed that three versions of the worm were in Morris' computer files, including one dated Oct. 15, 1988, and two dated Nov. 2, 1988, the day the worm was unleashed. Also in the files were a list of user ID/password combinations to accounts at Cornell and elsewhere and a list of passwords nearly identical to one contained in the worm, the commission said.

The commission did not attempt to estimate the losses or number of computers infected by the worm but called the Computer Virus Industry Association's estimate of $96 million "grossly exaggerated" and "self-serving."

Firm, but fair

The commission concluded that computer scientists seem to favor strong disciplinary measures for this sort of computer crime but not so stern as to damage Morris' career.

Since the incident, Morris has been unavailable for comment and is believed to be staying at his parents' home in Arnold, Md. On advice of his counsel, Morris declined to be interviewed, according to the report's authors.

Thomas Guidoboni, a Washington, D.C., attorney representing Morris, said last week, "The report does not have much that is new, and a fair amount of it appears to be based on speculation."

Three weeks ago, federal law enforcement officials and Morris' attorney asked Cornell officials to delay release of the report for fear that prejudicial publicity would hinder efforts to assemble an impartial jury if the case is tried [CW, March 20].

Law enforcement officials in Syracuse, N.Y., refused comment on the report's contents but said its release would not hinder the investigation. "We may have been overly anxious to ask them not to release it in the first place," said Andrew Baxter, an assistant U.S. Attorney for the Northern District of New York.

"It will make the selection of an impartial jury difficult, and that is the reason that I asked them not to release the report," Guidoboni said. "Apparently, they are not concerned about his getting a fair trial."

Hacker stereotypes changing

BY MICHAEL ALEXANDER
CW STAFF

These days, when law enforcement officials round up the usual suspects following the commission of a computer crime, they are just as apt to get their woman as they are their man. The stereotype of a hacker — a white teenage male who penetrates a computer system for the fun of it — no longer fits, according to a study released last week by the National Center for Computer Crime Data (NCCCD), a Los Angeles research firm.



NCCCD's BloomBecker

"Computer crime is an equal opportunity employer," said Jay BloomBecker, director of the NCCCD. The results of the survey indicated that women and minorities are increasingly as likely to commit computer crime as young white males.

The knowledge needed to perpetrate computer crimes is spreading rapidly through the population. "Increased access to computers is also increasing computer crimes, not only in the hacker community but across the board," BloomBecker said. The survey found that 32% of those arrested for computer crimes are women, 43% are members of a minority group and 67% are between 21 and 35 years of age.

The report also noted that former and current employees are more likely to breach a company's computer system than students, unemployed criminals, computer professionals and other occupational categories.

"The wise computer security professional will worry less about hackers and more about employees," BloomBecker said.

Computer criminals aim to steal money and services when they break into a computer system electronically, the report said. The two categories make up 70% of computer crimes.

The NCCCD calculated that the costs of computer crime in 1988 exceeded $555 million. It also estimated that computer abuse caused a loss of 15 computer-years in downtime and required 930 man-years to detect and recover from data alteration, viruses and other computer-related mayhem. The average computer security loss is $109,000, 26 computer-hours and 365 man-hours, the center added.

While the number of computer crimes is on the rise, so too is the number of arrests and convictions, the NCCCD pointed out. A canvass of 130 prosecutors' offices throughout 38 states in 1986 turned up only 75 cases of computer crimes. "For 1988, we project several thousand arrests," BloomBecker said.

The report noted that in California, where researchers were able to conduct a complete analysis of computer-crime data, 71% of those arrested for computer crimes were convicted. The remaining cases were split evenly between those dismissed by the court and those dropped by law enforcement officials.

"Those results are similar to what we found in our 1986 survey and not dramatically different than what we project nationally," BloomBecker explained.

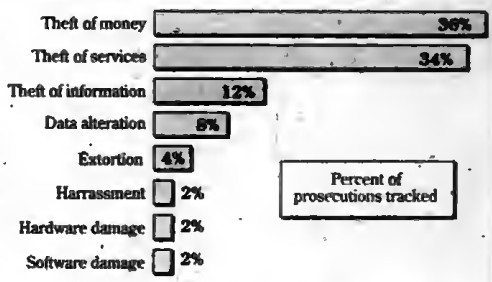
Laws governing computer crimes are also on the upswing, researchers said. In a 1986 survey, the NCCCD counted 35 states that had passed computer-crime laws. In 1988, researchers found 48 states (Vermont and Virginia are the exceptions) with computer-crime laws.

The computer-crime data in the report is based on a survey of prosecutors' offices in the U.S., data on computer-crime prosecutions in New York, California, Pennsylvania and the federal system and media reports. The report also contained data on the efforts of the nation's security profession to combat computer crime based on a survey of 3,500 computer security professionals.

A more detailed and exhaustive report, titled "Commitment to Security," will be published in June, the NCCCD said.

It takes a thief

An analysis of computer-crime prosecutions indicates that theft of money and services such as telephone and computer services are the most prevalent criminal acts



SOURCE: NATIONAL CENTER FOR COMPUTER DATA AND RGC ASSOCIATES
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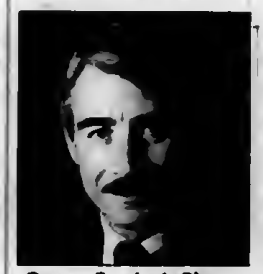
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technology more closely with the business, he said.

Ask Frank Glover, vice-president of marketing for retail and distribution insulation products at Owens-Corning Fiberglas Corp. in Toledo, Ohio. He is a former vice-president of MIS there. Rich Gonzalez, manager of new business administration at Great West Life Assurance Co. in Englewood, Colo., used to be Great West's manager of microcomputer systems. Cathy Hemmer, senior manager of planning at Metropolitan Fiber Systems, Inc. in Oak Brook Terrace, Ill., was formerly manager of MIS at the Midwest division of MCI Telecommunications Corp.

"Everything we do is getting so dependent on computers that to pretend you don't need an understanding of it doesn't make sense," Gonzalez said.

In most cases, the shift in focus from systems to another area is painless and the risks few, Epstein said. "When you're in MIS, you tend to be analytical about things," Hemmer noted. Moving out of systems "was an easy transition for me because in the planning department, you also have to be analytical," she said.



Owens-Corning's Glover

According to those who formerly worked in the field, IS can also be a good training ground for other skills, including management, planning and communications. Still, those who can effectively make the transition away from IS are typically visionaries, Epstein said.

"I fell in love with the systems and programming area and began to see the opportunities it provides for getting to know a company and how it operates," Wier said. She said she moved beyond IS because she wanted to play an even larger role in the management team. "I was fortunate that at Britannica, I was able to move out of that technical area," she said. She did that by taking on responsibilities beyond IS in 1975 and moving away from it altogether in 1982. Britannica tends to promote from within, said Wier, who subsequently earned an MBA.

For McCartin, the move out of MIS 12 years ago was not quite so calculated; in fact, it was a surprise. He said he wanted to gain a better understanding of Noxell's functional areas so that he could better serve those areas as the company's director of MIS. Classes in accounting eventually led to a CPA certificate.

"Much of the activity that I worked on or managed was accounting systems," McCartin said. When a position opened up, "the newly appointed senior VP of finance knew my knowledge of accounting and asked me to become the controller."



Metropolitan Fiber's Hemmer

It takes management recognition to move up from the IS function. Glover and Gonzalez said they shifted away from IS after being encouraged to do so by management.

Epstein noted that many companies groom future executives by rotating through various departments, including IS. That training can lead to greater future interest in the role systems can play, and managers are likely to retain at least informal ties to that area. For Hemmer and Wier, the ties are more formal: The MIS departments of their companies report to them.



Noxell's McCartin

McCartin said he is in daily contact with Noxell's MIS workers, and he continues to serve as a member of the Baltimore chapter of the Data Processing Management Association. He taught data processing at Johns Hopkins University for 17 years.

Gonzalez still attends technical conferences and meets with vendors occasionally. When Great West added Sun Microsystems, Inc. workstations running Oracle Corp.'s Oracle relational database management system, Gonzalez took the developer's class "so I would have a good understanding of what the capabilities of our computing platform are."

TRENDS

Executives and PCs

Nearly 90% of top managers are involved with personal computers at work, but many cannot tell you which package comes from which vendor.

"Opportunities for Marketing PC Software," a survey of more than 450 *Fortune Magazine* subscribers, set out to trace a profile of managers' involvement with and knowledge of PCs and PC software. It found that managers are no strangers to the PC.

Eighty-seven percent of top managers surveyed, compared with an almost equally resounding 81% of the subscribers, said they use PCs, supervise users or play a role in PC hardware and software buying decisions. But when asked to match 34 software products with their respective vendors, only six products were identified correctly by at least half the respondents.

Nonetheless, almost half the executives reported that they are "professional" or "competent" users, and more than 60% said they are often consulted by their colleagues on matters of PCs and PC-related products. Further, executives who use PCs at work are experienced: They spend an average of more than 11 hours per week at their PCs and have been using PCs for an average of almost four years.

In terms of current use and of possible future purchases of machines, IBM was the prevalent brand. Fifty-nine percent of respondents who now use PCs at the office work on IBM equipment, and 60% of those likely to buy machines during the next year were leaning toward IBM. The Personal Computer XT was the most widely used machine — by 20% of respondents — but the Personal System/2 was the most often planned, by 23%.

Apple Computer, Inc. and Compaq Computer Corp. were runners-up, both among machines installed and among potential orders. Apple gathered up 19% of PCs in use and 28% of future picks. The Macintosh SE was at work for 8% of executives and the Mac II for 6%. They traded places, though, in terms of plans: The Mac II, with 15%, led the SE, with 11%.

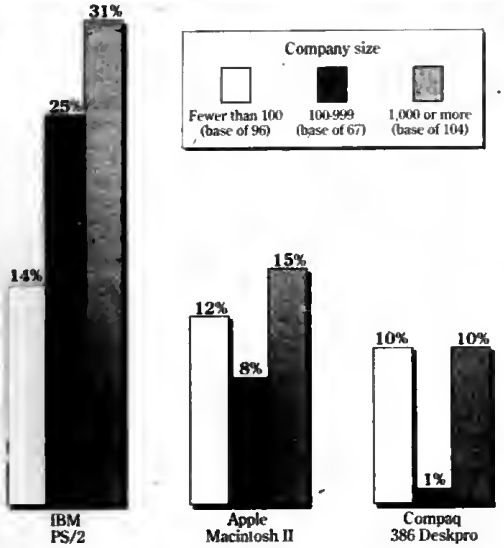
Compaq claimed 13% of PCs installed and 24% of plans. The Portable III 286 and Deskpro 386 tied in the number of installations, but the Deskpro edged out the Portable in plans.

The study suggested that Apple and Compaq are widening their portion of the PC field.

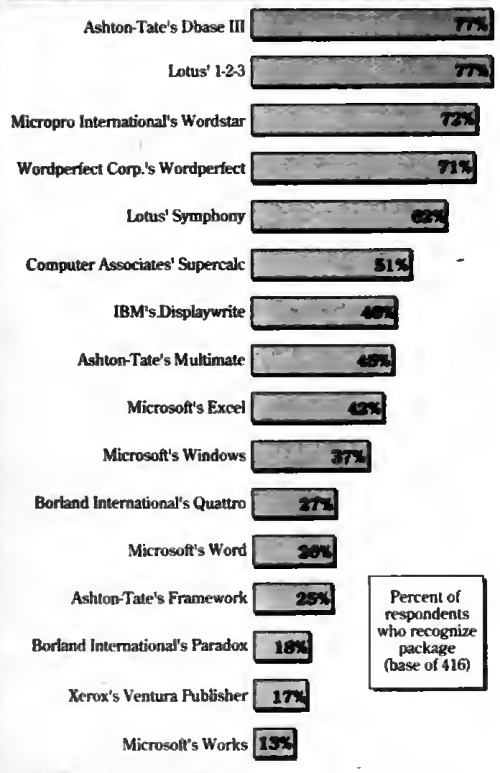
LAURA O'CONNELL

Company size a big factor in PC buying

PERCENT OF RESPONDENTS PLANNING PURCHASE IN NEXT YEAR



Many execs don't know who makes what



*Among those who use PCs or manage PC users

SOURCE: *FORTUNE MAGAZINE* MARKET RESEARCH

CW CHARTS: FRANK C. O'CONNELL

INSIDE LINES

Service with an electronic smile. IBM has plans to expand its Service Director tool to printers and other peripheral devices. First on the list is the IBM top-of-the-line laser printer, the 3800; work is under way now, but IBM won't say if it will be ready by year's end. Service Director, an IBM Personal System/2-based performance monitor, was introduced earlier this year as a tool to help users monitor storage devices. The system is linked to an IBM service center for diagnostic tools.

Custom network showdown. The Federal Communications Commission will tackle the Tariff 12 issue at a special meeting Tuesday amid rumors that the FCC will reject the controversial AT&T tariff for custom networks and force the firm to resubmit it with modifications. MCI and other rivals have led the protest, arguing that Tariff 12 is too customer-specific and could lead to anticompetitive abuses. No word yet on how this will affect the customers who already have signed onto Tariff 12 — namely, General Electric, Du Pont, Ford, American Express and American Airlines.

Don't forget to look at the MAP. Two staffers at GM subsidiary Electronic Data Systems — one in manufacturing and the other in the Plant Automation Group — have allegedly completed a study on the Manufacturing Automation Protocol (MAP) that came up with "differing opinions than GM holds," according to a source. Putting politics aside, our tipster claims the report's authors plan to go ahead and recommend that GM, a leading MAP proponent, not implement MAP in some cases. EDS spokesman Tony Good would only say that EDS conducts many studies for its clients.

Get out the suntan lotion. Sun Microsystems is set to launch a new line of workstations based on its Scalable Processor Architecture (Sparc) on April 12. Sun will also introduce a workstation based on Motorola's 68030 microprocessor. The Sparcstation — which has been commonly and probably misleadingly referred to as the "Sparcintosh" — will debut at a press conference at what promises to be a gala event in San Francisco. The entry-level Sparcstation will be priced at less than $10,000.

Built for speed, not software. Intel's new versions of the 80386 and the 80486 microprocessors will not immediately provide users with anything more than speed, according to sources. The 33-MHz 386 will boast an 80-nsec dynamic RAM speed and 20-nsec static RAM speed. The 486, built around the 386 architecture, will be twice as fast as the 386 and top out at 10 million instructions per second, said a source close to Microsoft. It will also provide linear memory addresses and a 487 floating-point calculator. But the 486's new features cannot be fully exploited until a 386 version of OS/2 is released, the source claimed.

Ironing out the irony. A side benefit of Novell's agreement to purchase Excelan is the latter's OS/2 LAN Manager license. Novell's Netware and Microsoft's LAN Manager are, of course, rival technologies. "This must be driving Bill [Gates] wild," an observer gloated. But Microsoft claims to be delighted over the prospect of Novell joining the fold. "There's certainly no slashing and burning going on here," said Rob Glaser, Microsoft's director of LAN Business. However, he did note that Microsoft can control the extent to which Novell will benefit from Excelan's license.

Ringing bells in Tandem. An estimated $1 billion in business for Tandem from AT&T may be brewing for Tandem's unannounced low-end Unix product, expected at midyear and based on Mips Computer Systems' RISC chip.

IBM, DEC and Unisys profits — down, down, down. Capital goods spending — down. So why is everyone smiling? Don't ask us. But you can fill us in on why depressing economic news isn't bad news for the computer industry. Hook up with our bulletin board by setting your modem to 508-626-0165; or, if you prefer to communicate the old-fashioned way, let your fingers do the walking to 800-343-6474 or 508-879-0700 and ask for News Editor Pete Bartolik.

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COMPUTERWORLD

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OF COMPUTERWORLD
APRIL 3, 1989

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- A question of vendor bias
- On the fast track
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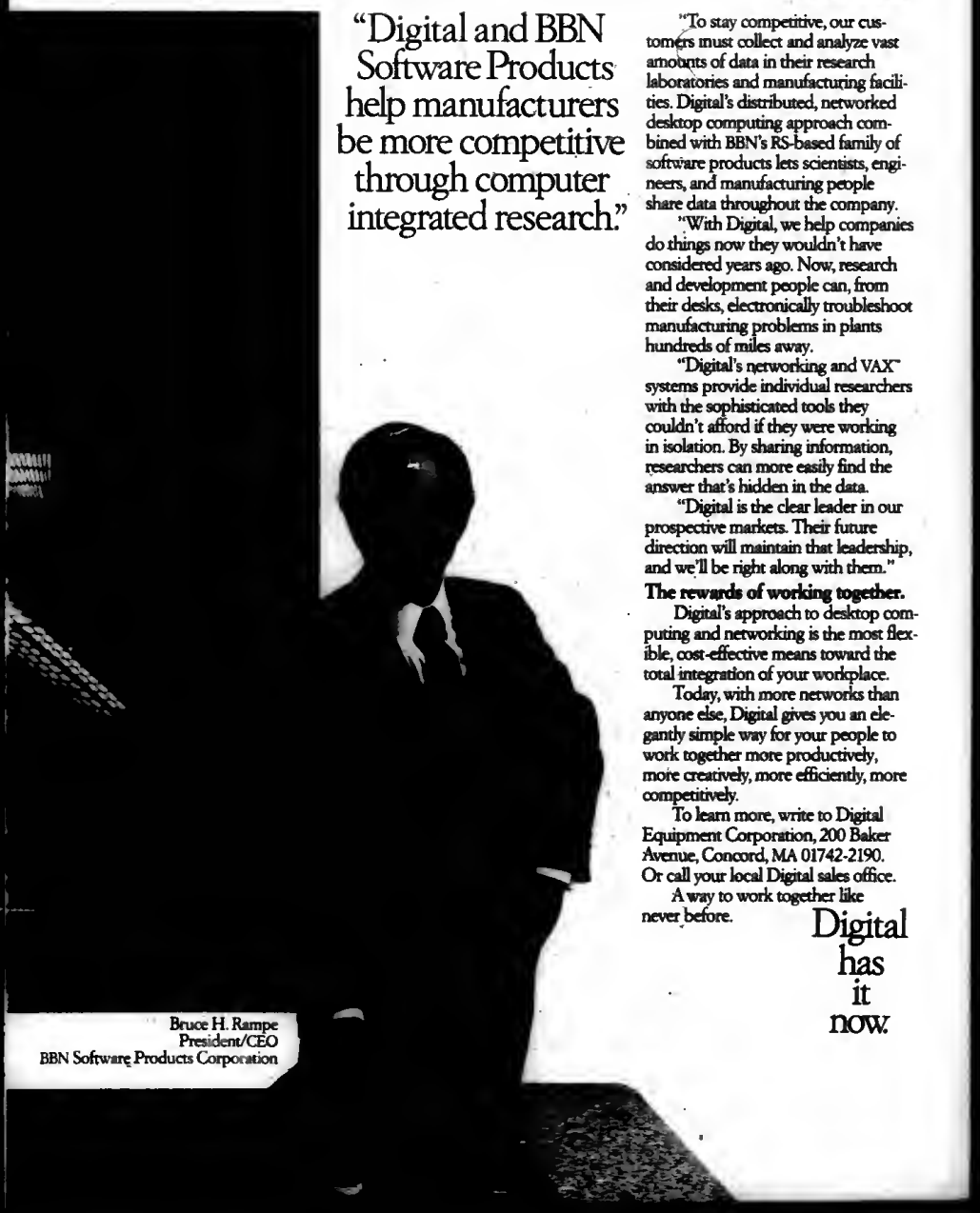




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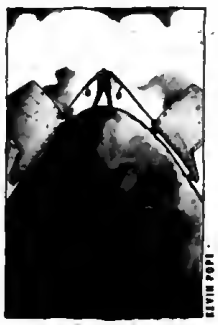
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Reader response is music to our ears

Our first issue of *Computerworld Focus on Integration* seems to have struck a chord, if reader response is any indication. The feedback has been tremendous for the magazine and the integration topics and technologies it covers.

What we have concluded from this reaction is that even though there is a lot of integration activity on everyone's part, there is still a lot of confusion. What are vendors *really* offering? Should you go with a systems integrator or struggle on alone? Is integration possible with today's technology?



None of these are easy questions to answer, nor, unfortunately, is the process of integrating your technologies and organizations easy. But then again, when has it been effortless to reach a goal with such a great potential for reward?

Our objective is to help you find some answers in our publication.

Our objective is to help you find some answers.

Take our cover story — How many of you have strategic, long-term plans in place to help you move toward integration? Senior writer Helen Pike talked to a number of IS executives who have gone through the complex planning process. She found out how they put their integration plans in place and why they feel strategic planning has given them a jump on their competition. She also discovered that their integration strategies are irrevocably entwined with today's changing business climate.

Writer Mark Breibart provides some surprising findings in his story on "PC LAN control: Who has it, who doesn't." Read what he has to say about the evolving relationship between IS and end users when it comes to networking.

And while you're at it, read Stan Kolodziej's story on whether you can trust vendors to deliver the best integration solution without product bias.

Let me know your response to these and other stories in this issue. We want to hear your war stories, your ideas and your thoughts on both integration technology and on our *Integration* magazine. Write me, Ann Dooley, Editor, *Computerworld Focus on Integration*, 375 Cochituate Road, Box 9171, Framingham, Mass. 01701. Or call me at 1-800-343-6474 or our bulletin board at 508-626-0165.

Ann Dooley

letters



STAY IN TOUCH!
IF YOU HAVE ANY COMMENTS ABOUT OUR COVERAGE, PLEASE CONTACT US. ADDRESS YOUR LETTERS TO: THE EDITOR, *COMPUTERWORLD FOCUS ON INTEGRATION*, 375 COCHITUATE ROAD, FRAMINGHAM, MASS. 01701. OR REACH US THROUGH OUR BULLETIN BOARD NUMBER — 508-626-0165.

Replacing the sacred order

Congratulations! Finally, a publication that is starting to focus on achieving objectives and solving business problems rather than just focusing on plain old technology.

After managing an IBM Briefing Center and consulting and listening to top executives for the past 12 years, I have heard them say what they want, and I have seen what they get. It has been a rude shock.

People are only now starting to appreciate what technology's real impact will be on how we live and work. The key is that information is no longer in the hands of the technical priesthood. (When only priests spoke Latin and Cobol, they controlled.)

However, the priests are not giving up easily. In the rapidly changing business world, with its mergers and spinoffs, as pointed out in Helen Pike's article "Oh, no! We've been sold" [*Integration*, Feb. 6], top management can no longer afford to wait 10 years and spend $10 million to convert or integrate dissimilar technologies.

Conversion and technical integration are expensive relics, cloaked in technical terms that are not in the vocabulary of today's executives.

We still have a long way to go, but the means to get there is now at hand. There is no need to throw away existing technologies that work to implement new strategic applications and integration. Let the old technologies "rust out" gracefully and nondisruptively while we take advantage of new tools to achieve our business objectives.

Nondisruptive should become the key work in all systems integration efforts. This will not be welcome news to vendors and technologists who thrive on the latest and the greatest and who prefer words like "international standards," "bridges," "gateways" and so on. These elements are all worthwhile, but they are either not here yet, take time, are costly, require disruption or do not solve business problems today.

The old priests have served us well, but as your articles continually point out, it is time for a change in perspective.

The pace of change is blinding but exciting, and new thinking is required to survive and thrive.

Integration should take on a new meaning and vocabulary that reflect business objectives vs. technical terms. It's what you want to do that is important, not how you do it.

I would hope to see more articles along this line so more people can start to realize the potential that can be ours.

JAMES G. SPENCER
BUSINESS INFORMATION CONSULTANT
BOCA RATON, FLA.

Keep it up

Keep up the great work and nice look of *Focus on Integration* and be sure to continue to fill us in on what's happening with the Apple story. Mark Breibart's clip, "Fill our cups, Apple," was great. While I am not yet an IS heavyweight, I do enjoy your coverage.

ERNEST LEHMANN
APPLICATION SUPPORT ANALYST
KELLY SERVICES
ROCHESTER, N.Y.

X marks the spot

I would like to see your magazine focus on X Windows and X terminals because these seem to be coming areas that warrant some press. Love the *Focus on Integration* issues; keep them rolling.

MICHAEL HIGGINS
TECHNICAL SUPPORT MANAGER
BYER CALIFORNIA
SAN FRANCISCO

Checklist for integration

I would like to see in *Integration* a checklist of the items and/or concerns that should be addressed when creating an integrated system. The information already exists in the text of many articles, but it would be nice to have a "check off" list or sheet for reference — possible two or three depending on whether a mainframe, all PCs or some other combination were involved.

VITO CARAVITO
CHIEF ENGINEER
GOODYEAR TIRE & RUBBER CO.
AKRON, OHIO

VAX workstation dilemma

We currently run an IBM System/38 and Digital Equipment Corp. VAX 8530 shop. Both machines are interfaced to each other. The problem is we would like the VAX 8530 to act as a workstation and emulate the System/38. Any suggestions from your readers on how I might go about this?

RAJ MUTHUSAMY
INTERNATIONAL SYSTEMS OPERATIONS
BANK OF CALIFORNIA
NEW YORK

A service to the services industry

Congratulations! *Computerworld Focus on Integration* is an excellent magazine and a welcome new source of information. I wish you the best of luck as you work to continue the high level of quality you and your staff have achieved in the premier issue.

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7	27	47	67	87	107	127	147	167	187	8	28	48	68	88	108	126	148	168	188
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11	31	51	71	91	111	131	151	171	191	12	32	52	72	92	112	132	152	172	192
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TOO MANY JOBS, TOO FEW SPECIALISTS

Carl Kelly isn't running a training center for systems integration specialists. But you'd think he was with all the calls he gets from headhunters seeking people with integration skills.

Kelly, vice-president and general manager of the systems integration division at Planning Research Corp., an information services organization in McLean, Va., says the calls are a result of what is happening in the market. Systems integration is seen as critical for businesses, but because this is a recent phenomenon, the number of high-level executives with integration skills is limited.

The need for such executives is not confined only to systems integration and high-tech firms, according to Herb Halbrecht, president of Halbrecht Associates, Inc., an executive search firm in Stamford, Conn. In an era of heavy decentralization, many organizations, especially in the banking and financial fields, are turning the IS function into a strategic business unit whose main thrust is to integrate technology to gain a competitive edge.

What kind of personnel are companies looking for? Halbrecht says executives with 15 or more years of integration expertise and business experience are highly prized. And highly paid. Both Kelly and Halbrecht put salaries at between $90,000 to $150,000 a year.

For companies that have such sought-after employees, keeping them satisfied is crucial. Halbrecht says the very enticements recruiters use to land executives for their clients are the ones companies should use to retain their best people. It takes a combination of compensation, challenge and benefits — as well as a clearly defined growth path.



• Demand for integration specialists keeps Kelly on the phone.

Kelly's solution is to maintain a surplus of technically adept and business-savvy staff by "forward hiring," that is, hiring in anticipation of a need.

And well he should. For the near term, the market for integration specialists is going to remain tight, says Bill Young, president of search firm Bill Young Associates, Inc. in Fairfax, Va. — By Lory Zottola

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FIVE YEARS IN THE LIVES OF DATABASES

Year	IBM's Activities	Database Vendors' Activities	Users' Activities
1990	Introduces central system repository to integrate databases and CASE.	Workstation software vendors begin major shift toward object-oriented architectures.	Users begin to perceive how distributed databases can aid integration.
1991	Extends remote SQL requests to multiple mixed databases.	Adaption of products to IBM's central system repository and object-oriented systems.	Main concerns are with integration of database with other software.
1992	Announces first object-oriented facilities for relational databases.	Natural language interfaces become more common.	Leading-edge users use object-oriented systems for commercial applications.
1993	Completes heterogeneous distributed database environment that joins across mixed systems.	Major shift of emphasis to object-oriented systems.	Mainframe shipments start to decline as distributed systems and databases take over more applications.
1994	Enhances performance of distributed databases. Major extensions to object-oriented facilities. Software revenues reach levels comparable with declining mainframe revenues.	Major shakeout of suppliers as IBM tries to dominate software industry.	Vendor competition and available technologies such as object-oriented systems extend range of computer applications to new areas on a large scale.

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All this opens up enormous possibilities. For example, a financial institution with offices in New York, Chicago and Los Angeles can seamlessly tie together their

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three DECnet networks over SNA to speed electronic funds transfer.

The gateway also supports standard security interfaces--RACF, ACF2, TOP SECRET, VM/SECURE--as well as user-created security packages.

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■ IBM STRATEGIES

VENDORS SEIZE OPPORTUNITY IN MARKET IBM OVERLOOKS

A few years ago, IBM gave an artificial intelligence party for MVS. They called it YES/MVS. Attendees at YES/MVS were given a mission: Develop expert systems that could be used for increasing the performance of IBM's MVS, software that was (and still is) notorious for eating data resources.

MVS performance had increasingly come under pressure as the operating system began to handle the load of networked systems.

Nothing much came of that YES/MVS project.

Ironically, an IBM expert system called Knowledgetool, developed outside the scope of YES/MVS, has quietly become one of the most widely used expert system tools within the MVS performance monitoring business — widely used by vendors other than IBM, that is.

IBM admits that it is not actively selling Knowledgetool. The company has pretty much left the fast-growing performance monitoring business to the likes of Candle Corp. and Boole & Babbage, Inc.

Meanwhile, firms such as MVS Software, Inc. have been supplying performance monitoring links to Knowledgetool and other expert systems, enabling users to customize how a system will respond to problems during MVS operations.

"Expert systems like Knowledgetool give operators more flexibility to reconfigure the order of computer system jobs," explains Earl Hodil, director of technical support at MVS Software. "I don't know why IBM doesn't promote it more." — By Stan Kolodziej



MVS' appetite slows its performance.



The best route between your Novell LAN and a mainframe is just ahead.

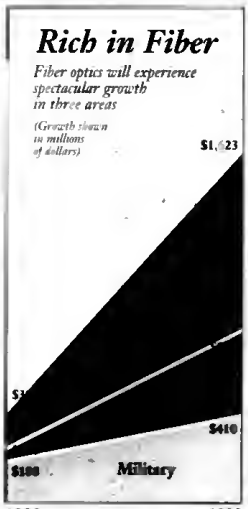
FIBER FINDS FAVOR

According to KMI estimates, by 1992, the use of fiber optics will more than triple.

There's good news for communications managers who want to use fiber but are frightened by the cost. Fiber cabling has been unpopular because it's more expensive than copper wiring, but as its use spreads, prices are expected to fall.

By 1992, the use of fiber optics will have more than tripled, reports Kessler Marketing Intelligence Corp. (KMI) in Newport, R.I. More than half of that increase in usage will come from telephone companies.

The divested Bell operating companies are by far the largest consumers of fiber, says analyst Judith Flynn at KMI. In the next few years, they will continue to upgrade and expand the feeder portion of the public phone lines — the piece connecting the central offices to distribution points.



SOURCE: KESSLER MARKETING INTELLIGENCE CORP., NEWPORT, R.I.

For data communications, a major impetus will be the growth of local-area networks. One of fiber's advantages over twisted-pair cabling is that it can maintain high data transmission speeds over longer distances, which becomes important as LANs extend throughout large corporate complexes.

Even for shorter distances, LANs will increasingly be tying together graphics applications, computer-aided design and manufacturing programs and engineering workstations, all of which can benefit from fiber's faster transmission speeds.

The Fiber Distributed Data Interface (FDDI) standard should give the use of fiber another boost when it arrives in the next year or two. Such standardization promises a stable market of products that can take

continued on next page

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If you need a fast, reliable, efficient way to connect your Novell LAN to an IBM mainframe, the signs all point to RabbitGATE.™ No other gateway offers Novell LAN users more performance and flexibility.

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RabbitGATE's comprehensive IPX/SPX support enhances Novell LANs and gives each workstation about 20kb of memory by eliminating the need to load NetBIOS. IPX/SPX also provides faster, more efficient network routing. And it enables inter-LAN gateway access–for SNA, BSC, DFT, and X.25 networks.

And RabbitGATE support doesn't end with Novell LANs. It works as well with NetBIOS LANs. And like all Rabbit products, it provides a growth path con-

continued from previous page
advantage of FDDI's 100M-bit speed.

Finally, computer makers are exploiting fiber's speed and high bandwidth for connecting CPUs to peripherals and even for tying processors to each other.

Much of the increase in the datacom use of fiber also comes from the growth of fiber-based private-line networks. These lines are used by telecom managers who hope to save money by bypassing the public phone system. — By Mark Breibart

NOTED

ACCORDING TO THE SOFTWARE PUBLISHER'S ASSOCIATION, SALES OF INTEGRATED PC SOFTWARE ROSE FROM $128.1 MILLION IN 1987 TO $182.6 MILLION IN 1988, A GROWTH RATE OF 42.6%.

■ IN THE COURTS

FCC ADOPTS AT&T PRICE LIMIT PROPOSAL

The Federal Communications Commission has ruled in favor of what is considered potentially the biggest issue for data and telecom users since the breakup of AT&T.

The FCC has adopted AT&T's price limit proposal, which enables the carrier to escape from an FCC ruling that arose from the company's divestiture. Previous legislation put a cap on the amount of profit AT&T could make on long-distance communications services. The new legislation, however, places price limits on the carrier's long-distance rates instead.

In effect, AT&T will not be able to raise or lower communications rates for business users more than 5% each year.

An increase in AT&T profit margins might be passed along to users in the form of lower prices.

This scheme will likely increase the company's profit margins if coupled with lower operating costs and upgraded telecom equipment, AT&T says.

According to August Blegen, executive director of the Association of Data Communications Users and veteran of the telecom regulatory scene in Washington, D.C., an increase in AT&T profit margins might be passed along to communications users in the form of lower prices, which has happened in the past.

Others are not so sure. The International Communications Association and the Consumer Federation of America, both representing numerous U.S. private and government telecom users, remain wary, saying it will be some time before the extent of savings to users becomes clear. — By Stan Kolodziej



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■ ON THE CONTRARY

INTERSTATE NETWORK TRAFFIC TAX HARMS THE TELECOM INDUSTRY

AT ISSUE. A Supreme Court ruling handed down in January allows states to tax interstate voice and data traffic. The decision in the *Goldberg v. Sweet* trial upheld an Illinois law imposing a 5% excise tax on interstate voice and data transmissions that begin or end in the state. The following debate underscores the controversy that has arisen from the ruling.

PRO: KENNETH L. PHILLIPS

The recent U.S. Supreme Court decision asserting the lawfulness of states imposing a tax on interstate telecommunications is neither a mandate to do so nor a sound policy directive for state governments to follow.

Telecommunications is no longer simply one of the many monthly overhead items constituting the cost of doing business. Rather, as growth in the economy moves increasingly into the service sector, telecommunications becomes a strategic asset as well as the cornerstone of the product-differentiation process.

To the extent that telecommunications is taxed, disincentives are being applied to both the highest growth sector in the economy and, perhaps, to the area with the greatest decided advantage over offshore competition.

Members of the Committee of Corporate Telecommunications Users report that increasingly, telecommunications considerations are determining site location decisions for back-office and large data processing facilities.

As a result, the Supreme Court has tacitly created an opportunity for states that choose *not* to create such new taxes. These states may become especially desirable as locations for telecommunications-intensive functions, especially with distance-sensitive costs declining quickly.

States that have densely populated urban centers stand to lose more in sales tax and personal income tax than they would otherwise gain in a 5% or 6% tax on interstate telephone calls.

Taxing telecommunications is a tax on the future, and while this action may be legal, it is hardly logical or even productive of significant net revenue to the states.



• Phillips (top) is chairman of legislative affairs for the Committee of Corporate Telecommunications Users.
• Flug (bottom) is a partner in the Washington, D.C., law firm of Lobel, Novins, Lamont & Flug, attorneys for the State and Local Legal Center in the *Goldberg v. Sweet* case.

CON: JAMES FLUG

The U.S. Supreme Court has made clear that interstate businesses, such as telecommunications companies, must bear their fair share of the expenses of the state government in which they operate. States can levy taxes — income, excise, sales, gross receipts — that are tailored to each business' level of activity connected with the state. If one activity escapes a state tax, then the tax burden will be unfairly shifted to all other activities.

Even GTE Sprint Communications Corp., in *Goldberg v. Sweet*, admitted that telephone activity is taxable. But it argued that instead of one state taxing an entire interstate call, the tax should be apportioned among all states involved in the call. This solution would not work.

As the states pointed out, the realities of modern telecommunications make such a proposal totally impractical for interstate carrier and customer alike: Identical calls may travel hundreds of thousands of different paths and a single call may switch routes in midstream many times to reflect traffic and technical conditions.

The telephone industry is much better off with the simple and straightforward system upheld in the Goldberg case — either the state of origination or termination should tax a call, depending on which end is paying for it. The possibility that the definitions of "paying" might overlap should cause no concern. Even if, unlike Illinois, a state did not give credits for tax paid to other states, a multistate customer could adjust its payment practices to avoid any problem of overlap.

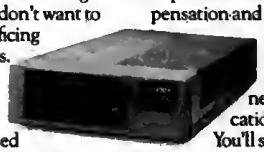


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The Networking Experts

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■ TECHNOLOGY WATCH

U.S. FIRMS WANT TO BE PART OF NEW HIGH-TECH TV PICTURE

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Too futuristic to think about now? Stop and think again. The cross-pollinatioo of computer and television technologies is under way, with the competition heating up between Japanese, European and American manufacturers.

Sony Corp. has applied to the U.S. Defense Advanced Research Projects Agency for funding that the agency has set aside for high-definition televisioo (HDTV) research. Using high-resolution displays and image-processing technologies, HDTV delivers images that are sharper and more detailed than those that are currently available.

The technology will be made more attractive by the advent of digital sound.

AT&T and Zenith Electronics Corp. say they intend to co-develop a system to deliver HDTV quality to the home market for now and are focusing their efforts on transmission, production and reception equipment. They are also seeking a chunk of the DARPA funds, which total $30 million.

As other firms consider the market, computer industry leaders are planning a for-profit U.S. consortium to exploit the hardware and software opportunities expected to proliferate in the wake of HDTV's acceptance in the consumer market.

A U.S. consortium of companies has been formed to exploit the opportunities in the wake of HDTV's acceptance.

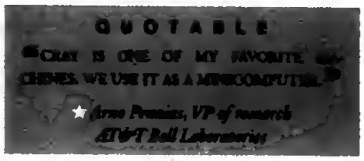
"You've really got to think of it beyond television," says a spokesman for Digital Equipment Corp., which defines the technology as the digitized integration of voice, video and data.

David Nelson is also thinking beyond TV.

Earlier this year, the chief technical officer at Apollo Computer, Inc. stepped down to launch Confluent Systems, Inc., a company that will meld such technologies as full-motion video, optical devices and more sophisticated computing to allow for greater input and manipulation of data in a single box.

Nelson's venture follows in the footsteps of another Massachusetts startup, MRS Technology, Inc. in Chelmsford. The 2-year-old company is busy cranking out equipment for flat-panel display screens, which may replace the giant screens now used to show HDTV images.

The flat-panel technology, combined with HDTV's attributes, may eventually make the traditional computer screen obsolete. — By Helen Pike



IBM SAA PRODUCTS PREPARED FOR TAKEOFF

IBM's Systems Applicatioos Architecture (SAA) — the company's future platform for networked applications — continues to go from theory to practice.

IBM is readying a Personal System/2 programmable workstatioo designed with SAA in mind, according to consultant David Andrews, president of ADM, Inc. in Cheshire, Conn.

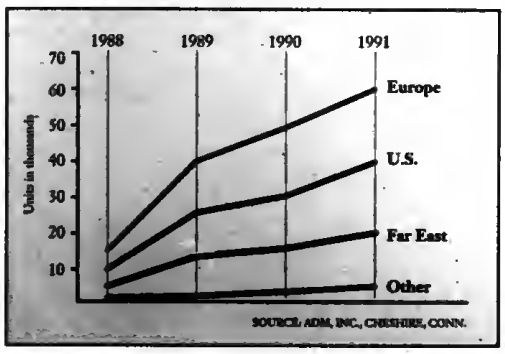
The workstation's first program will be an office application that will have a decision support module as one of its key features, he adds.

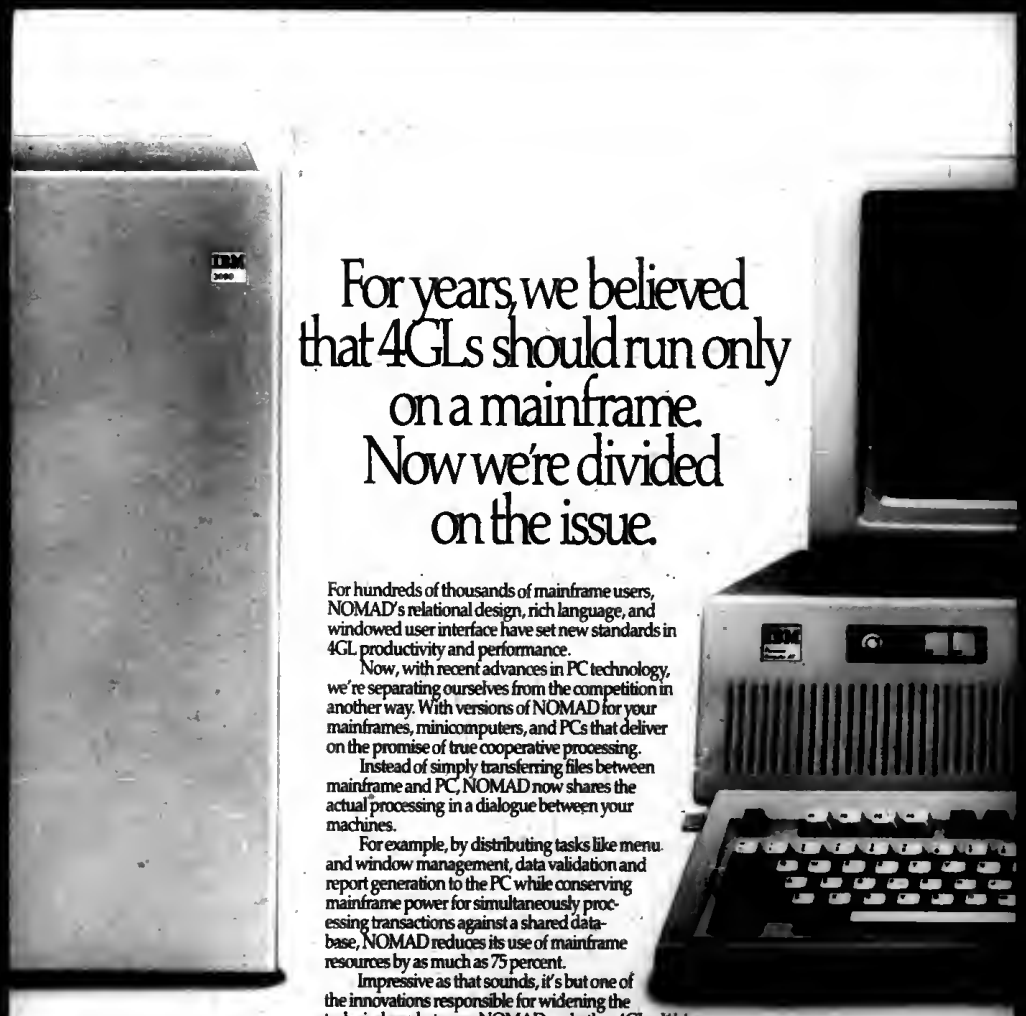
But new software doesn't stop there. In June, IBM is expected to unleash a blitz of programs for users of the Applicatioo System/400, a pivotal component of its SAA strategy.

Included in the early summer announcement is Release 2 of AS/400's operating system that is designed for cooperative processing and connectivity, especially to the new PS/2 workstation, Andrews says. — By Helen Pike

Middle management

Forecast of minimum AS/400 worldwide unit sales





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THINK profit

Savvy integration planning can turn a poor economic outlook into better financial times.

BY HELEN PIKE

THE MIDWEST. A REGION of America where companies harnessed rivers such as the Mississippi and the Ohio to transport their products to competitive markets. But the character of that competition is changing. To net greater profits, these companies are trafficking more in raw data than in commodities. Instead of navigating nature's waterways, today they are integrating rivers of information to bring in greater revenue.

As the markets they serve churn with restructuring, four companies serving four different industries are integrating their individual data operations to meet financial objectives. They are in the fields of health care, retail building supplies, chemicals and telephone services. Though headquartered in the Midwest, these companies have integrated business and technology in strategic plans that may serve as blueprints for enterprises in similar positions elsewhere in the country.

To go anywhere with an integration plan, the first step is to understand the business climate in which a company finds itself. For executives at Payless Cashways, Inc. in Kansas City, Mo., that meant coming to grips with four years of lackluster profit growth.

With 195 nationwide stores dedicated to retail building materials, Payless Cashways had annual sales of $1.9 billion in its latest fiscal year but also found out that cheaper competitors were boring holes in its profits. Senior management at the privately held company knew it had to come up with a plan that would plug the holes and throw off rivals.

"The strategic plan was to shift business from serious do-it-yourselfers to contractors and tradesmen sales," explains Vince Heiker, IS vice-president. As part of getting closer to this new customer, the company is contemplating a networking scheme between headquarters and the retail stores for a more accurate flow of inventory.

Lower-cost competitors are also a bane to the hospital industry. Although the site of the world's first artificial heart implant, Humana, Inc. in Louisville, Ky., is grappling with an occupancy rate that is less than 50% in its 84 hospitals scattered across the Southeast, West Coast and Europe.

Despite annual revenue of about $4 billion, "the hospital business is in the doldrums," says Joe Vincent, technical planning director at the medical facility, "because people are going more to walk-in clinics.

"We're not volume-driven," he adds. But like product-generating firms, Humana decided a business goal lay in delivering "timely decisions based on quality data. [It's] more important than in the past."

The business plan for one of the world's largest chemical companies meant coming to grips with a broad product diversity. Monsanto Co. in St. Louis decided to get out of the chemical commodities arena and con-



JEAN FRANCOIS ALLARY

solidate around its core agricultural/chemical research. To strengthen this position and get a leg up on the competition, it bought into the pharmaceuticals industry with the purchase of G. D. Searles Co.

The marriage of Monsanto and Searles is one based on information sharing. Discoveries that yield bug-resistant corn, for example, might also lead to the production of better insulin, says Leonard Cohn, IS vice-president and one-time company chemist. Such finds are the result of cross-research and development in animal, plant and human sciences, he says.

The ceaseless quest for cost savings and greater computing efficiency motivated Southwestern Bell Telephone Co. to come up with a plan to streamline its data operations in 1975. Bloated DP operation had resulted partly from an increase in technology that had, over the years, spawned more and bigger computer purchases.

With 16 data centers in a five-state area, "we were having trouble meeting schedules. The data throughput was slow. The training was slow. Everything seemed slow," recalls Kenneth Bender, IS vice-president, in a recent interview at the company's St. Louis headquarters. "We were so big and didn't have the hardware and software to give customers data in one easy form."

And waiting in the wings was the deregulation of AT&T that would create the seven holding companies, each with its own regional business goals.

The commercial objective at Southwestern Bell Telephone, then, became how "to get the right data to the right user at the right time," Bender says about the strategy that also mandated a $16 million cost savings.

Clearly, Southwestern Bell had come face-to-face with the next step in drafting a plan that helps a company retain its competitive position in a turbulent market: defining how integration will be used to implement a company's revenue objective.

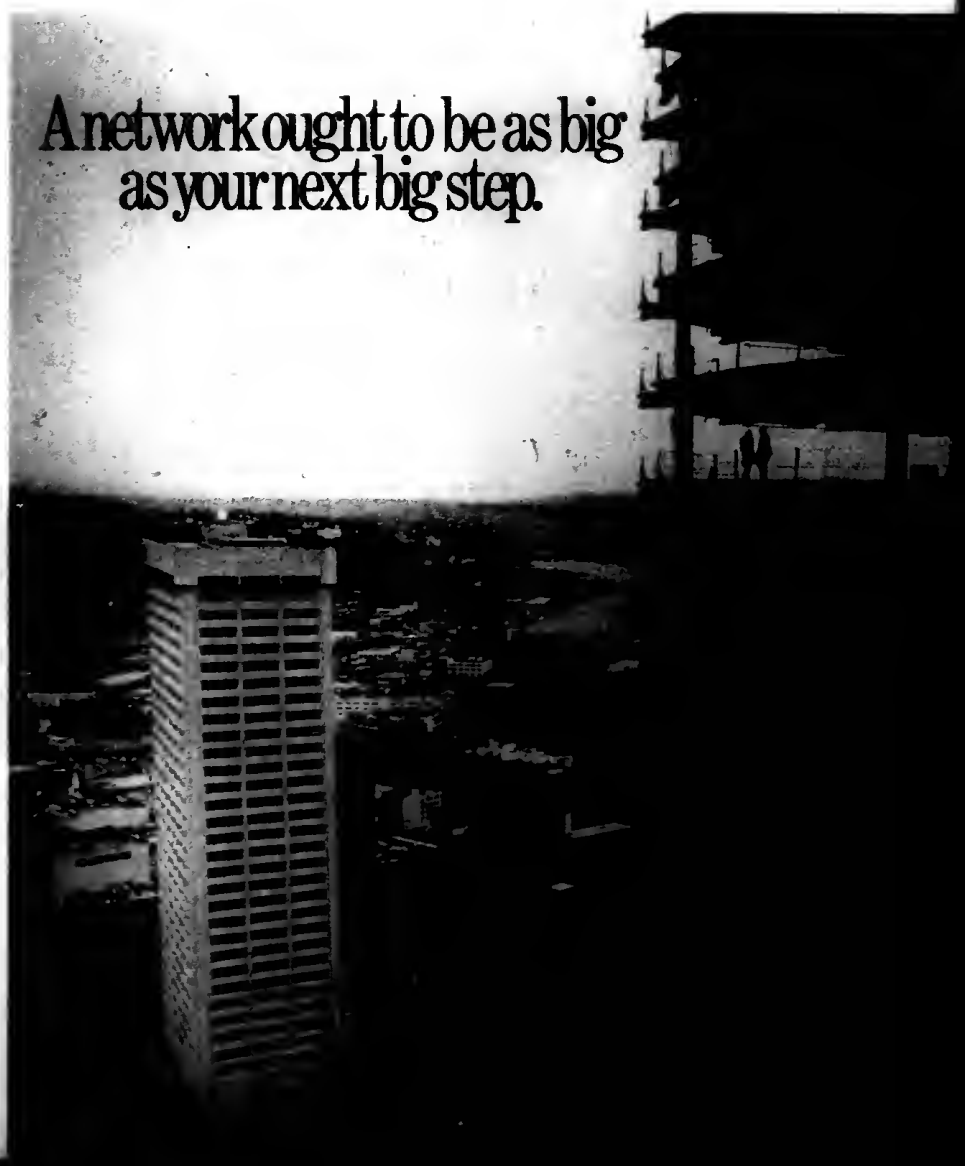
At Southwestern Bell, an internal study revealed there were a lot of redundant applications along with the overequipped DP operations. Integration, therefore, came to mean downsizing operations; in effect, consolidating data centers over the five-state area.

At Monsanto, integration came to

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CRUSADING AGAINST COMPLACENCY

GARY KIRKHAM isn't a shy individual.

"I come from the trenches," he says about his IS days at oil conglomerate Atlantic Richfield Co. and chemical and machinery giant FMC Corp. "I was born in the ranks." But those ranks weren't so willing to acknowledge one of their own when Kirkham switched to the ranks of consultants to sell the concept of integration planning.

"We had gotten inefficient, fat, dumb and happy," Kirkham says, blasting his former profession about the excesses he feels it got mired in when the Midwest's economy took a downturn. "I'd knock on the doors of MIS, telling them I could save them money. No soap.

"Finally, I found it was easier to schedule appointments with the CFOs, CEOs and COOs. The guys in DP were trying to shore up crumbling empires while the top guys knew DP was a money hole they were pouring resources into."

Kirkham is executive director of Forecasting Planning Associates in Dallas, and he gets brought in by top executives to get the IS staff to answer the uncomfortable question: Is what I have right now effective and as efficient as it should be?

Kirkham advises IS to align its applications with the company's business lines, especially with those parts of the company that produce profits.

If you don't want a Kirkham-type character to knock on your door, be suggests going on the offensive and asking executives to allow IS to get in on the early stages of the business decision making process. Then, get the chief operating officer to champion your cause, he says. Next, convince a crackerjack technician and a good businessman to sign up for your integration team.

Kirkham also believes in a five-year skeletal plan for integration, one in which IS "front-loads the plan with projects with the biggest payback." Those projects tend to be "the easiest [ones] to do, and they bring in the money quickly," he says. But he is quick to warn that a five-year plan should not result in creating another institutional and, therefore, complacent approach to IS.



mean the combination of physical, electronic and people resources, according to Cohn. The company wanted to take care of business internally in order to take better care of the customer externally, he adds.

Cohn predicts Monsanto's "Plant of the '90s," in which data from the process control systems is integrated into the manufacturing of products, will evolve into being called "Business of the '90s" as the integration strategy brings Monsanto closer to its customer.

In going through the definition phase, Humana made a distinction between data integration and technical integration, Vincent says. Data integration is more software oriented, while technical integration is more grounded in physical media.

Monsento's Cohn sees the company heeded closer to its customer.





Heiker defines integration as networking and software support for Payless Cashway's new, more sophisticated client base.

"Integration rolls easily off everyone's tongue," he observes wryly. "It's a mental concept. Trying to get a consensus is where we are."

For Payless Cashways, integration is seen as networking projects, inventory management systems and software support that will increase contractor sales.

With business objectives firmly fixed and integration clearly defined, the next strategic planning step for most companies is to implement the appropriate technology.

A year ago, Humana established a three-member department within IS to look for ways to apply its technical tools to business problems, according to Vincent. One way is taking a careful look at what the facility's chief vendor, IBM, is doing internally with its "data repository or data warehouse" — a concept that is expected to yield a commercial product within a year, he says.

According to Vincent, the repository design calls for centralized applications that allows users to create and manipulate data instead of applications that merely centralize data.

Southwestern Bell's Bender heeded the call to streamline DP operations.



This approach is appealing to Humana because it could allow the facility to make better use of its health care data, he says.

SWAT team

But Humana knows time is of the essence in implementing an integration plan that will revive its profit growth. Referring to himself and his two colleagues, who were appointed because of their business backgrounds, Vincent says, "We are more a SWAT team than a think tank."

Payless Cashways is considering a strategy that is based as much as possible on standards, according to Heiker. The standard architecture in this case is IBM's MVS/ESA, with the vendor's SQL database running across all the company's mainframes, minicomputers and personal computers, he explains.

The plan calls for a migration to CICS and the possibility of a wide-area network in the 1990s. As Payless Cashways reaches out to a more sophisticated builder, the company is formulating plans for an inventory management system and networks between headquarters and its retail stores.

Telecommunications networks feature prominently in Monsanto's integration plan. There are major fiber-optic links between Chicago and St. Louis and videoconferencing capabilities from the U.S. to R&D facilities in Belgium.

Elsewhere, by using expert systems in its manufacturing plants, Monsanto is able to optimize, for example, its maintenance scheduling, Cohn says.

Getting small

While increases in technology had spawned more and bigger computer purchases over the years at Southwestern Bell Telephone, the upgrades in computer memory and speed helped spur the telephone company's downsizing as did telecommunications technology, such as VTAM networks and T1 carriers, that connect the remaining four centers in its regional area.

Consolidating applications, closing data centers and moving personnel resulted in a $22 million cost savings by 1988, $6 million more than was in the original business plan, Bender says, with obvious pride. Per data center, the closings averaged a $5 million to $10 million savings, he adds.

"There's nothing magical," Bender explains. "A really good group of highly motivated technical experts and miniaturization [of computer technology] did it."

As the executives from these four organizations illustrate, it is the integration of business acumen and technical pragmatism, not any kind of hocus-pocus, that prepares a company for an increasingly competitive — and global — market. Clearly, the information systems executive who recognizes the valuable role data has in his company is in the advantageous position to navigate his organization's fiscal future. ♦

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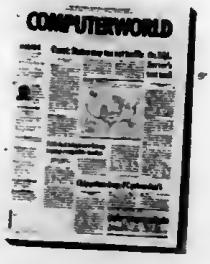
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PC LAN control

WHO HAS IT, WHO DOESN'T

THE DAYS OF US VS. THEM, of information systems staff against users, is pretty much on its way out, at least where PC LANs are involved. In this area of computing, no single corporate group is in complete charge. Though problems remain, cooperation is becoming the norm, not the exception.

Information systems departments, network administrators and end-user groups each share part of the responsibility for dealing with local-area networks, and, miracle of miracles, the division of labor usually lets all parties to do what they do best. The computer people tend to handle the technical decisions, and the business users tend to handle the software and applications.

Where once IS managers ignored personal computer networks or hoped they would go away, they now realize the low-price network is here to stay. Most also now understand that users, who initiated most of the networks, must stay involved.

Everything with LANs is not hunky-dory, of course. Technical difficulties abound, personal egos are still at stake, IS has not suddenly reshaped itself in the image of its users, and many companies' LAN policies are in a state of flux. Furthermore, the organizational structures that work in one corporate setting don't necessarily work elsewhere, so there are no easy rules to follow.

One organizational change has been prominent. Business units needing support for their LANs have commonly had to form their own technical groups. Now these groups have increasingly become part of the corporate computer department.

"Our experience with Fortune 500 companies," says Ronald Evans, who follows such trends for Nolan, Norton & Co. in Lexington, Mass., "is that 80% to 90% of end-user computing groups report to IS. It's not an either/or situation. They all figured out that computing is computing, no matter who controls it."

The degree of joint responsibility is best seen in the LAN purchase decision, which has been analyzed in a report by Infonetics, Inc., a research firm in Santa Clara, Calif. (see chart page 28). While managers with corporate-level duties, such as systems administrators and IS managers, had a lot of influence more often than anyone else, people with close ties to the business function, such as departmental managers and work group managers, had a significant say almost as often. Furthermore, the survey also showed that all groups, except users, were involved to some degree in purchase decisions at least 80% of the time.

Whatever the organizational setup, the LAN decision making process is basically the same.

At GTE Florida, Inc. in Tampa, for example, the money for networks comes out of the corporate information management budget. "But while we actually control it, we build the budget based on departmental needs," says Lanny Russell, director

BY MARK BREIBART

of management support systems. Users wanting a LAN come to the support group, and together they figure out what is needed and then include that in the budget, Russell explains.

More commonly, the dollars and formal authority reside with the department. Blair Ensinger says that at Bausch & Lomb, Inc.'s Professional Products Division in Rochester, N.Y., departments pay for network equipment out of their own capital budgets. But, adds this systems project manager, people in his division-level group act as budgetary consultants to the departments, specc-ing out the requests, giving guidelines for expected expenses and even writing up the purchase orders.

One reason corporate IS has gotten involved with PC networks is cost control. Though LANs aren't usually big-ticket items compared with mainframes or even minicomputers, they do require a lot of expensive, people-intensive support.

By organizing LAN support groups or bargaining for corporatewide maintenance contracts with outside vendors, IS managers can often save more money than if each network administrator went it alone. Furthermore, for plugging users into the corporate mainframe, network gateways are often cheaper than buying emulation boards for each PC.

Information planners are also beginning to see networking as a valid computing strategy. "If you look at the LAN as a corporate information resource — and we do — you've got to [get involved] to set the standards," GTE's Russell says. "Otherwise, nothing will be able to connect, or only with a lot of work."

Banking on LANs

Citicorp's Investment Bank in New York had no organized corporate support for its first LAN, brought in about six years ago. But as work groups were added to the now 300-node network, bank managers began to realize that LANs were a pretty effective way to distribute video feeds, pool modems and provide electronic mail, says Roger Bender, a Citibank vice-president in charge of microcomputing and LAN support. The bank has centralized responsibility in a LAN support group for those and other networkwide functions.



Many corporations, to be sure, haven't decided on how LANs fit into the corporate strategy. The networks are often, after all, still the new kid on the block. More than 80% of personal computers are either stand-alones or tied directly to the mainframe, and current networks tend to be small, averaging 14 nodes, according to David Perro, an industry analyst at Dataquest, Inc. in San Jose, Calif.

At a major U.S. Northeastern insurance company, where about 10% of the PCs are linked into 50 LANs, "a lot more attention is now placed on that platform than three years ago when top managers wouldn't admit it existed," says Carl Miller, an internal PC network consultant at the company. But while senior management has now endorsed the technology, he adds that there is no well-defined organizational structure to make sure users are getting as much from their LANs as possible.

As IS does get involved, user-oriented managers lose a measure of control. In a way, departmental LAN support people have been the victims of their own grassroots success.

Once the first network was in place, "someone from a different department would come by, see what was happening and say, 'I like what you're doing here,'" recalls Tim Crowell, vice-president of LAN support at the First Republic Bank in Dallas. But when there were two LANs in place, users realized they were duplicating efforts. They then got IS involved to try to avoid redundancy. "It was a natural evolution," Crowell adds.

Departmental LAN support people have been the victims of their own grassroots success.

LANs also introduced a level of technical complexity that users either didn't want or were unable to handle. Network users at eyewear company Bausch & Lomb are accountants, chemists and marketing managers with their own jobs to do, Ensinger points out.

"It's virtually impossible for even power users to keep up with all the technical changes," he says.

Sometimes, however, users can get out from underneath the technical problems completely. At Florida Power & Light Co. in Miami, an IS user-access services group usually takes care of the Novell, Inc. software that runs the network, says group manager Bill Wallace. The IS telecom people deal with the hardware, such as the token-ring cards, the cabling and the gateway.

More often, however, network managers work within the department as part of a three-tier structure that includes a corporate-level support group on top and the end users on the bottom. Bart DiMaso, vice-president of Office Systems Consulting at Shearson Lehman Hutton, Inc. in New York, describes the network manager as "a junior technical type who knows the business environment."

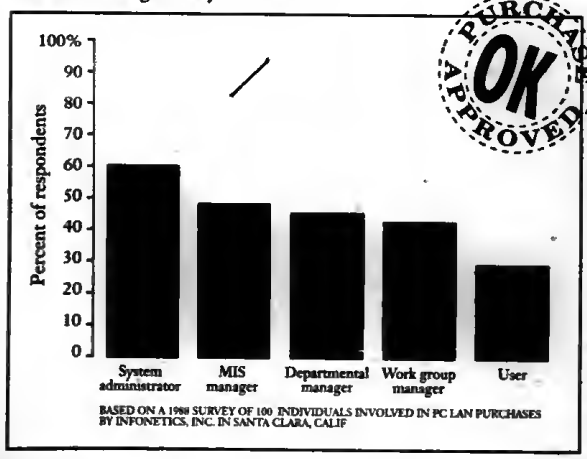
DiMaso's group, which is within the IS division at Shearson Lehman, then acts as an advisory group, as a "second level of defense" for users after the network administrator.

The main goal of the work group-level people, Citibank's Bender adds, is "to be concerned with the functionality" of the network, not the technical issues. The support group will help them, but applications software has been the responsibility of the work group, he says.

Despite the changes made by many corporations, the issue of control is still "a very delicate one," says Crowell. Even though users at the First Republic Bank had asked for corporate help when their LAN got large, they are still afraid of losing control of the system they built. The bank, recently taken over by the North Carolina National Bank, is, in fact, taking the opportunity of the management change to re-evaluate its LAN policies.

Even for those who believe their way works well, cooperation between IS and users requires constant vigilance. GTE's Russell says his company set up a separate information center within IS because without it, "users would never get the kind of attention they deserve. We had to get their needs out of competition with systems development in order to give them priority." ◆

Whose influence counts the most when deciding to buy PC LANs?



BASED ON A 1988 SURVEY OF 100 INDIVIDUALS INVOLVED IN PC LAN PURCHASES BY INFONETICS, INC. IN SANTA CLARA, CALIF



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ON THE fast TRACK

BY HELEN PIKE

JAMES A. SHATTUCK is not working on the railroad to pass the time away. Quite the co. ary. At Union Pacific Corp., time is money. Fierce competition in the freight industry is pitting carrier against carrier. In the aftermath of a deregulation process that began in 1980, railroad and air freight firms have been snapping up trucking fleets to protect their profit margins and expand their share of the transportation market.

Against this backdrop, Shattuck, an information systems executive, and other top professionals at Union Pacific Railroad and corporate parent, Union Pacific in Bethlehem, Pa., are reassessing their competitive future: Does Union Pacific want to be just another railroad company, or are there opportunities out there to provide a broader range of integrated services?

Results of a diversification effort already answer part of that question. In 1987, Union Pacific earned $583 million on revenue of $5.9 billion, most of that from five profit-and-loss columns dedicated to transportation, energy, natural resources, hazardous waste management and real estate development.

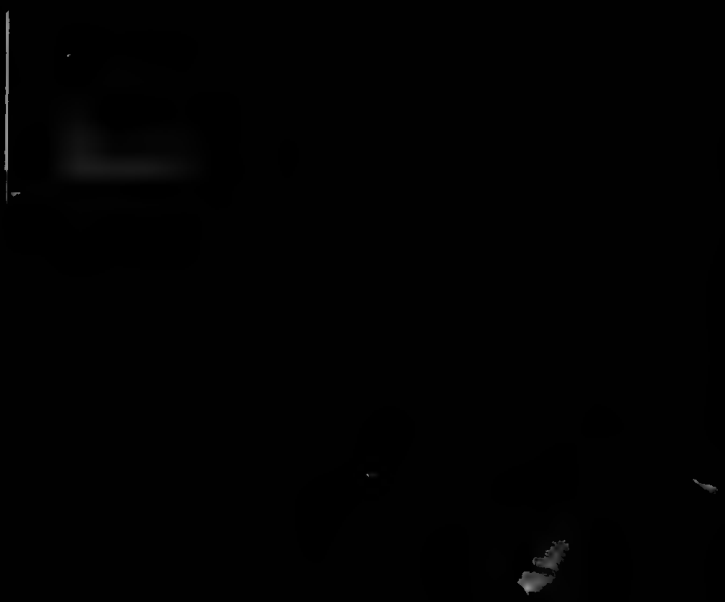
Then, in May 1987, the corporation went a step further and established a sixth P&L, this one from within the core of its operations — specifically, its information processing operations. It created Union Pacific Technologies (UPT) to answer further the question of how to broaden its business by integrating information technology.

UPT, based in suburban St. Louis, is the hub for Union Pacific's customer support. It carries out a twofold mandate:

- To help sister subsidiaries understand their individual business goals and then develop information systems to support their revenue strategies.
- To leverage internal software development by selling externally the information services associated with transporting freight of any kind on carriers of any kind.

Shattuck, previously assistant vice-president of information systems for the

BILL FLETCHER/HARMA LIAISON



Union Pacific's mandate was to establish itself as a transportation powerhouse by diversifying. To help reach that goal, James Shattuck (pictured) and the IS staff integrated all the systems of individual operating companies so they could ss infor ation ba nd forth

DATACOM/DB

COMPUTER ASSOCIATES

merged data operations of the Union Pacific and Missouri Pacific railroads, was appointed UPT's president and chief executive.

Largely an IBM shop, Union Pacific runs its operations in MVS with TPSS, the corporation's own teleprocessing support system that Shattuck describes as a "homegrown high-transaction rate environment with its own memory management." Union Pacific also runs IBM's IMS, DB2, TSO and CICS and uses Sage Software, Inc.'s Application Productivity Software, a Cobol code generator. It also provides commercial users with a time-sharing service to its various computer systems.

Shattuck and his newly deputized technical staff "decided to integrate all these systems that support the operation of individual operating companies [so they could] pass information between each other," he explains. For example, UPT has helped merge the data centers of Overnite, a Union Pacific trucking subsidiary located in Richmond, Va., with Union Pacific Railroad's data center in St. Louis, thereby helping to make each service complementary and more competitive.

"We have a good base of people with skills from the railroad," adds Shattuck, whose IS career in transportation began in 1963 working for rival rail company Southern Pacific.

Drawing from that railroad expertise, the staff at UPT has designed an $80 million state-of-the-art transportation control system to manage freight delivery. Three expert systems are featured components, dealing with billing, pricing and maintenance crew schedules.

Using document image processing products from Filenet Corp. in Costa Mesa, Calif., the UPT crew has installed an accounts payable system for billing in Omaha, the railroad's dispatch center, and a revenue accounting system in St. Louis to keep better track of sales. It is also trying out a hand-held bar code scanner for Overnite's truckers to improve the accuracy in pickups and deliveries.

Also for the railroad, UPT is working on an automated train control system that will monitor and control rail shipments. It will involve terminals on board each locomotive and transponders along the rail route to gather and transmit data back and forth from a central location to a locomotive. The system is expected to monitor speeds for safety as well as relay information about changes in container pickup and delivery.

UPT has coined a new term for its design — a computer logistical system. But UPT didn't stop there. To fulfill its second mandate, the company went a step further to design the Logistics Information Control System (Lincs) for the commercial transportation market.

By adapting what it has done for Union Pacific's rail, trucking and air freight businesses, UPT has created a database of rates, schedules, weights, delivery routes and types of carriers and their availability that customers can access through electronic data interchange (EDI). It is data that is particularly useful to customers implementing just-in-time techniques, so much so that a seventh P&L has been formed to address JIT concerns (see sidebar above).

Among the 1,300 EDI customers are other rail firms, banks and GE Information Services. Lincs is expected to be fully operational by 1990 and to generate over 50% of UPT's income from commercial customers by 1992.

Shrugging his shoulders as he says there's no sleight of hand with designing an integrated system, Shattuck adds, with a grin, "It's common sense, but no one does it." ♦

UPT'S EXPERT OPERATION

ON FEB. 28, Union Pacific created a seventh P&L based on some of the integrated design principles of Lincs.

Called Union Pacific Logistics and based in Bethlehem, Pa., the new operating unit will customize shipping arrangements for organizations seeking to improve inventory flow. It is an outgrowth of Union Pacific Technologies' work to meet customer demands for just-in-time manufacturing and delivery.

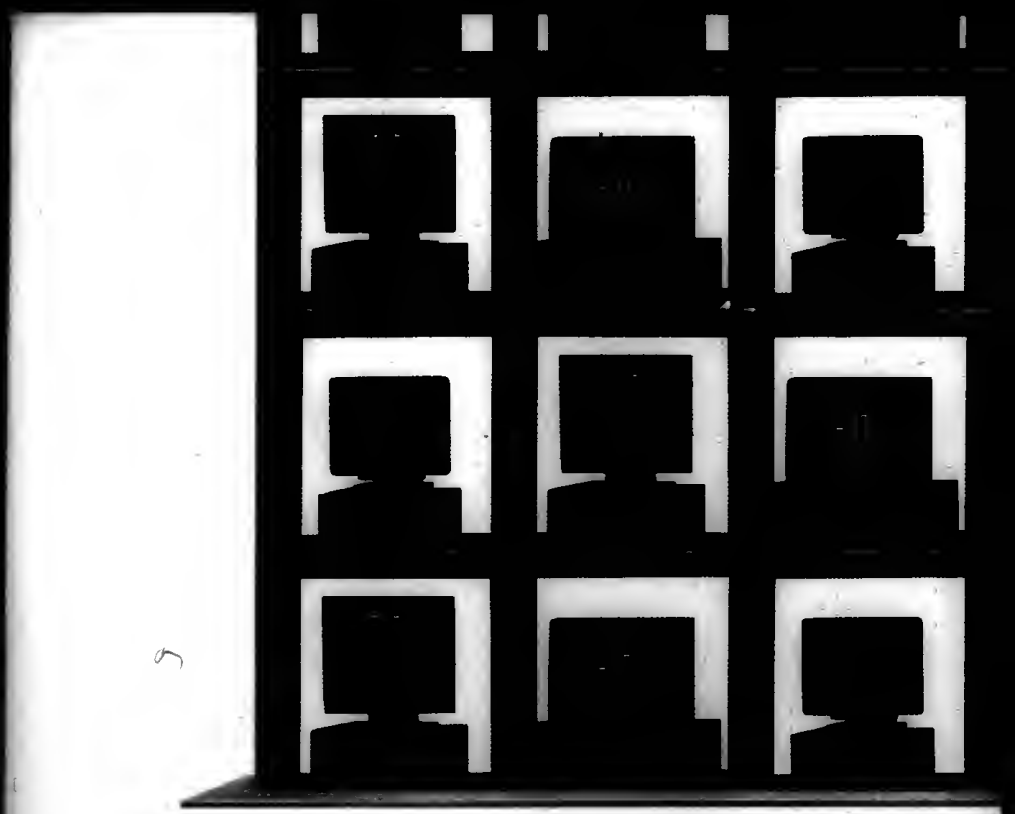
Using an expert system, UPT enters customer expectations for materials and timetables and then proceeds to monitor shipments on specified carriers until they get to their destination, according to L. Merill Bryan Jr., UPT's executive vice-president.



L. MERILL BRYAN *wants to help customers improve their inventory flow.*

"It's designed to better manage customers' inbound flow," says Bryan, who, like James Shattuck, also worked for the Southern Pacific and Missouri Pacific railroads. More recently, he was assistant vice-president of systems development and implementation for the merged data processing operations that resulted when Union Pacific bought Missouri Pacific.

In helping launch Union Pacific Logistics, UPT will act as software developer and implementer, Bryan adds, a part UPT is increasingly playing as the parent company continues its integrated foray into the future.



Novell gateways undergo stress

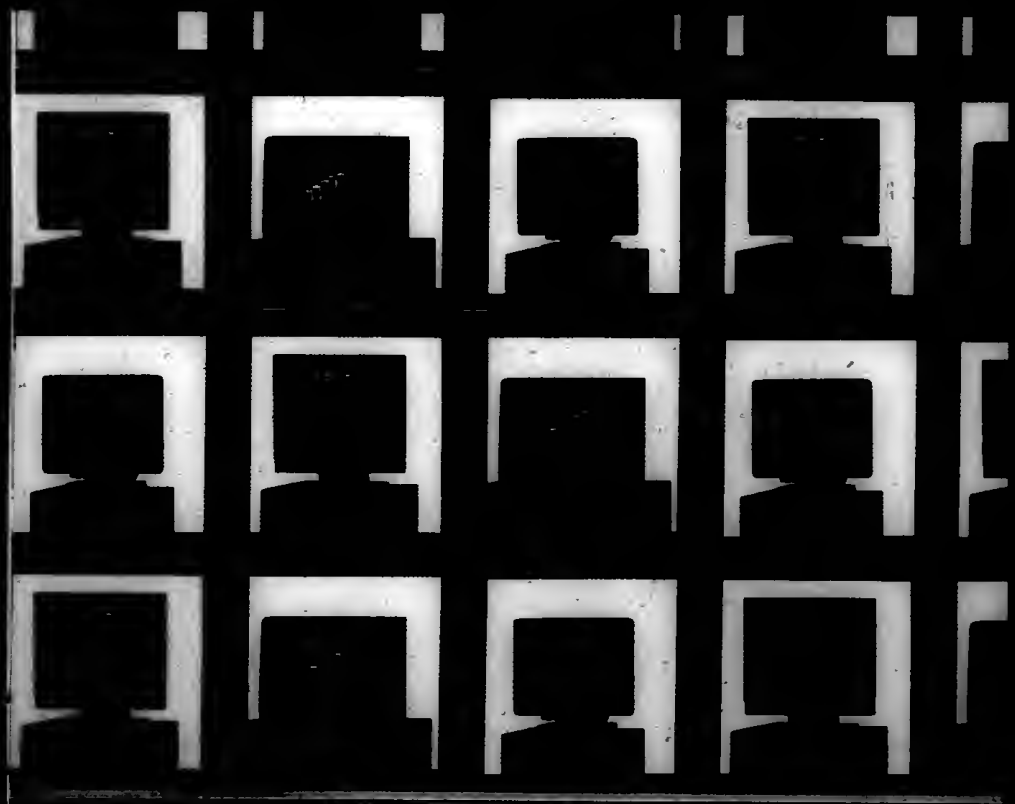
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THE BIG payoff IN EXPERT SYSTEMS



STEVEN B. PAGE

TWO YEARS AGO, organizations that were building prototype expert systems could consider themselves ahead of the game. Now, organizations stuck in the experimental stage risk finding themselves at a disadvantage. Prototypes are out. Integrated production systems are in.

Bringing expert systems from promising idea to deliverable application has required rethinking one conventional idea about the technology: that it is best suited for unique, stand-alone applications. Most information systems managers still regard expert systems in the context of applications such as automobile repair diagnostics, personal financial planning and oil exploration.

That's a mistake, according to Jay Wurts, chairman of artificial intelligence hardware and software vendor Symbolics, Inc. in Cambridge, Mass. He maintains that "most expert system applications being built today are for operational applications like running factories and speeding credit card transactions."

One of the keys to this expanded role for expert systems has been the development of techniques for integrating these systems into more conventional environments. "Operational systems can't sit in a vacuum," Wurts explains. "They have to get at data, and that means the challenge has been to fold expert systems applications into mainstream systems."

FREEDMAN *is a free-lance writer based in Brookline, Mass.*

BY DAVID FREEDMAN



The need for expert systems to integrate with conventional applications and databases has been the key limiting factor to the success of expert systems, according to John Donovan, chairman of systems integration firm Cambridge Technology Group, also in Cambridge.

"The right artificial intelligence technologies have all been available," he says. "But how do you use them if you can't establish a cost-effective interface to an IBM 370 environment, where most companies' information resides?"

In just the past few years, several vendors have developed techniques for bringing expert systems into conventional environments — and a growing number of customers are finding that the new capabilities fill an important gap. "We needed an expert systems development enviroment that worked with IBM mainframes," says Roger Schelm, vice-president of applied research at Philadelphia-based Cigna Systems, an information processing arm of insurer Cigna Corp. "It's only relatively recently that expert systems have been able to function that way."

Schelm's group has wasted little time in making integrated expert systems technology pay off, having completed a back-end analysis and report-writing application for a conventionally designed medical insurance information system.

The older system tracks the claims filed by employees that work for Cigna's group insurance customers and provides a tabular report of several categories of claims. The information is important in helping Cigna's customers find ways of lowering their health insurance costs. For example, the data may bring to light

ROGER SCHELM, ***president of applied research at Cigna Systems, has wasted little time in making integrated expert systems technology pay off.***

abuses of benefits like sick time, prompting a change in a customer's internal policies. Or perhaps a customer might find that certain areas of insurance coverage are not being used by its employees, justifying some change in coverage that might save it money.

But getting such information from the conventional system required training Cigna representatives in interpreting and explaining the older, cryptic tabular reports.

However, now the expert system back end combs through the data, identifies areas of potential concern and produces a report that spells out the results in plain English, complete with recommended courses of action. The expert system module runs on the same mainframe as does the main body of the application and the associated databases, communicating smoothly with them as would any other application.

The younger generation

Schelm thinks his system is typical of the new generation of expert systems applications. "Most major efforts in the expert systems area are aimed at front-end and back-end systems for existing applications," he says, "because they're easier to work with and to isolate." Such systems would clearly be useless, he adds, if they couldn't be closely integrated with existing applications.

MCI International has also developed an expert systems back end to a conventional application. The Rye Brook, N.Y., division of MCI Communications Corp. provides a telex message transfer service for hundreds of U.S. banks that do business with overseas correspondent banks.

Formerly, MCI simply passed the telexes it received on to its customers, leaving the banks with the time-consuming and critical task of sorting through the validation data included with most of the thousands of messages they receive each day. The data verifies the identification of the message sender. "If you're being asked to transfer $10 million dollars from your bank to another bank, you better make darn sure you know who's asking you to do it," explains Ashim Das, a technical advisor at MCI.

MCI knew it could save its customers a great deal of time by having its system automatically determine whether the message was a money transfer and then pull out and process the validation data. But because much of the information in the messages is written in free-form English and because message formats vary from bank to bank and even from operator to operator, conventional systems weren't up to the task. An expert system was, however. MCI had a back-end expert system built that runs on a pair of Symbolics processors specifically designed to handle AI applications efficiently; the link to the conventional system is established via a Digital Equipment Corp. Microvax acting as a file server.

MCI now provides the expert system-based message classification and validation service to The Chase Manhattan Bank, N.A. and Irving Trust Co. and is talking to several other customers about adding the service. According to Das, the capability is responsible for doubling the volume of messages that Chase and Irving have routed through MCI. "Most of these banks deal with several different telex message carriers besides us," he explains. "Now that we offer this added benefit, the banks tell their correspondents to send messages through MCI. The expert

YOU ARE HERE

EXPERT SYSTEMS are still uncharted territory for many IS managers. The following are a few pointers from managers with first-hand expert systems experience on how to identify and manage opportunities for the technology.



- Identify project needs ahead of time, and specify exactly what it is the system is supposed to do. Don't start with a blue-sky idea and hope the expert system can do most of it.
- Appoint someone to be in charge of expert systems technology for the organization. It's important enough and complex enough an area to warrant a full-time position at larger organizations.
- Don't proceed without a solid and well-thought-out commitment from the highest levels of the organization, otherwise, projects could be torpedoed by erratic funding or by disappointed executives with unrealistic expectations.
- Do extensive pilot testing and validation of the expert system's knowledge base. Even experts don't yet fully understand all the ways in which an expert system can go wrong.
- Do a standard cost/benefit analysis of all projects. Although payoffs will be harder to predict as precisely as those from conventional projects, don't build all your justification around vague, serendipitous benefits.
- Select only projects that have an unusually high payoff-to-cost ratio. As with all young technologies, expert systems are likely to be far less expensive to build in just a few years, so it makes sense to put off all but a few low-risk projects for now.

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U.S. Companies Involved In ISDN Trials And Service Rollouts

Company	Switch	Access	Carrier	Status	Note
Aetna, Hartford, Conn.	AT&T 5ESS	Basic	Southern New England Telephone	Installation underway	
American Express, Phoenix, Ariz.	AT&T System 85 PBX+5ESS	Primary	AT&T	Started July 1988	First customer of AT&T's Primary Rate
American Transtech, Jacksonville, Fla.	AT&T System 85 PBX+5ESS	Primary	AT&T	Started Dec. 1987	30th user site for AT&T's Primary Rate
Arizona, State of, Phoenix	Northern Telecom DMS-100	Basic	US West Communications	Started Nov. 1988, officially ended	
Burbank, Calif.	AT&T 5ESS	Basic	US West Communications	Scheduled start Nov. 1988	
Carnegie Mellon University, Pittsburgh	AT&T 5ESS	Basic		Contract pending	
Central Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer
Control Data Corp., Minneapolis	NEC MEAN 640	Basic	US West Communications	Started Nov. 1987, ends Nov. 1988	Trial
Duke University, Durham, N.C.	AT&T 5ESS	Basic	Southern Bell		
Northern North Fla., Gainesville, FLT.	Northern Telecom SL-100 PBXs	Primary		Started Aug. 1988	First Primary Rate using two SL-100s
Federal National Mortgage Assoc., Washington	AT&T 5ESS	Basic	C&P Telephone	Started June 1988	
Gilbert Inc., Research Triangle Park, N.C.	SL-1 PBX and DMS-100	Primary/Basic	GTE South	Started June 1988	First Primary Rate/Basic Rate in one trial
Hardee, Rocky Mount, N.C.	Northern Telecom DMS-100	Basic	Carolina Telephone	Scheduled start Jan. 1989	
Hayes Microcomputer Products Inc., Norcross, Ga.	AT&T 5ESS AT&T 5ESS	Basic Basic	Southern Bell Pacific Bell	Started April 1988 Trial, 1987 to mid- 1988	Using ISDN to develop ISDN products
Hershey Foods Corp., Hershey, Pa.	Army exists	Basic	Contel of Pennsylvania	Scheduled start Oct. 1988	Will include ISDN satellite transmission
Honeywell Information Systems (Honeywell Bull), Minneapolis	Northern Telecom DMS-100	Basic	US West Communications	Started Jan. 87, officially ended	Applications included data/voice transmission between office and employees at home
Johns Hopkins Medical Center, Baltimore	AT&T 5ESS	Basic	C&P of Maryland	Contract pending	
Lawrence Livermore Laboratory (University of California), Livermore, Calif.	AT&T 5ESS	Basic	AT&T Federal Systems		
Lockheed Missiles and Space Co. Inc., Sunnyvale, Calif.	AT&T 5ESS	Basic	Pacific Bell	Started Sept. 1987, ended Sept. 1988	Trial
Mayo Foundation, Rochester, Minn.	Northern Telecom	Basic		Scheduled rollout Oct. 1988	Using AT&T 5ESS as PBX for outside network
Naval Air Test Ctr., Patuxent, Md.	AT&T 5ESS	Basic	AT&T Federal Systems	Started Aug. 1988	Multi-site ISDN deployment of 30 lines
McDonnell Douglas Corp., St. Louis		Primary	AT&T	Unannounced	
Milestone Inc., Elmsford, Mass.		Basic	New England Telephone	Installation underway	Part of contract contract
Motorola Inc., Schaumburg, Ill.	Northern Telecom DMS-100	Basic	Illinois Bell	Planning stage	
Nynex, Manhattan	AT&T 5ESS	Basic	AT&T Federal Systems		
Rice Corp., Ogden, Utah	Northern Telecom SL-1s	Primary			Telemarketing company using private ISDN
Rockwell Wilkins, Newport, Ct.	Northern Telecom SL-1s	Primary			PBXs at Rocky Hill, Ct. and Meriden, Ct.
Schaumburg, Village of, Illinois	Northern Telecom DMS-100	Basic	Bell of Pennsylvania	Contract pending	Extended network with ISDN in Harrisburg
Snet & Wilcox, East Hartford, Conn.	AT&T 5ESS	Basic	SNET		
Texas Instruments, Plano, Texas	AT&T 5ESS	Basic	Southwestern Bell	Started April 1988	Pilot is underway
Rockwell Communication Systems, Richardson, Texas	AT&T 5ESS with two remotes	Basic	Southwestern Bell	Scheduled start Dec. 1988	35 buildings in a campus environment will be linked via ISDN
Shell Oil Co., Houston	AT&T 5ESS	Basic	Southwestern Bell	Start Sept. 1988	Plan to add 1,000 ISDN lines
Southern Methodist University, Dallas	Siemens EWSD	Basic	Southwestern Bell	Started Feb. 1988	
Southland Service Corp., Atlanta	AT&T 5ESS	Basic	Southern Bell	Started April 1988	Paying customer
Sprint, Kansas City, Mo.	AT&T 5ESS	Basic	Southern Bell	Started Aug. 1988	Plan to use 3,000 ISDN lines
Texaco Inc., Houston	AT&T 5ESS	Basic	Southwestern Bell	Started June 1988	Plan to use 3,000 ISDN lines.
University of Arizona, Tucson	AT&T 5ESS	Basic	US West Information Systems Inc.	Planning stage	Using AT&T 5ESS as PBX in private network.
University of Connecticut, Storrs	AT&T 5ESS	Basic	SNET		
University of Indiana, Bloomington	Northern Telecom DMS-100	Basic	Indiana Bell		
U. of Minnesota, Minneapolis				Unannounced	
University of South Florida, Tampa	AT&T 5ESS		GTE South	Started Oct. 1987	
U.S. Bank of Oregon, Portland	Northern Telecom DMS-100	Basic	US West Communications	Started March 1987	Trial
Virginia, State of, Richmond	AT&T 5ESS	Basic	C&P of Virginia	Started April 1988	
West Virginia University, Morgantown	AT&T 5ESS	Basic	C&P of West Virginia	Scheduled start Dec. 1988	Plan to use 600 ISDN lines.

Note: This chart was compiled by CommunicationsWeek with information provided by Telesis Communications Inc., Eatontown, N.J., as well as from news releases and published reports. Centrex, switch manufacturers and their affiliated laboratories are not listed.

The ISDN Scorecard.

As the demand for ISDN grows, so does the number of ISDN suppliers eager to take credit.

But, as you can see by this CommunicationsWeek chart, there is one clear-cut ISDN leader—the company that helped build the standards for ISDN. That company is AT&T.

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So, while other suppliers are still in product development trials, AT&T Network Systems is helping phone companies across the nation offer ISDN services right now on today's network. Services such as simultaneous voice and data transmission, high-speed facsimile and electronic mail all over a single phone line.

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system has given us a competitive advantage."

Das says that Western Union Corp. and other bank messaging competitors have already started working on their own versions of expert systems. "But by the time they're on-line, we'll have established our edge," he boasts.

No more paper route

The MCI system will eventually classify messages into 35 types and automatically route them to the appropriate bank department, Das claims. The company also plans to introduce a personal computer-based extension that will reside with the customer, allowing a bank to do some local automatic message sorting and routing. The module will communicate with both the MCI system and the bank's own systems.

Some observers believe that the most promising application for expert systems is as front ends to conventional applications. "The real advances in computers in the 1990s will be to make them usable," asserts Cambridge Technology Group's Donovan. "Today, you can't just walk up to an order-entry system and start using it. Expert systems can provide the interface that makes that possible — if you can make expert systems work with the existing systems." Donovan offers as an example a physician's workstation system to which Cambridge Technology recently added a voice recognition and image processing interface. The interface allows a doctor to retrieve information on patients — including patient photographs — and order tests with little or no training on the system.



REID KAPLAN, *a senior applications specialist at Yale, says that adding intelligence to old systems is like giving them a "midlife kicker." And Yale's personnel/payroll system just got that kick.*

Yale University's IS department has embraced the concept of expert system-aided ease of use. Yale's IS department, which annually enters some 50,000 forms relating to payroll alone, added an expert system front end to ease the burden on both the people who enter the data and the people who want to access the data.

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AT THE CROSSROADS



THERE ARE TWO basic approaches to integrating expert systems. One is to use an expert system development environment that has been specifically designed to run on a mainframe. IBM, Cullinet Software, Inc., Aion and AI Corp. all offer products that run alongside mainframe applications. The other approach is to establish a gateway betweeo a dedicated expert systems applicatioo and a conventional application. Symbolics is one company that follows the gateway route.

The mainframe approach has obvious appeal to IS departments, which typically cast a suspicious eye on any application that requires a specialized operating environment. "Expert systems should be fielded oo the same platform as the platforms that traditional applications are running on," insists John Landry, Cullinet executive vice-president of development. Landry claims that the mainframe approach is particularly well-suited to transactioo processing applications such as order entry and cost accounting systems.

Harry Reinstein, Aion president and CEO, ideotifies three types of integration an expert system should provide with conventional applications. The first is the ability for the expert system to access and update data associated with the conventional applicatioo; the second is the ability for the conventional application to automatically call the expert system module as a subprogram; and the third is the ability for the expert system to call parts of the conventional applicatioo as a subprogram.

Though not all customers use all three types of integration in every application, Reinstein notes, any one type can be crucial to a particular application. Thus, Lincoln National Insurance used Aioo's development environment to build a primarily expert system-based risk management system that calls on parts of conventional applications, while Pacific Bell used the environment to add expert systems modules to a primarily conventional network design application.

A $27 million savings

The gateway approach can have advantages as well. Complex, high-transaction volume expert systems applications tend to run inefficiently on conventional computers because of the unique programming structure of expert system rules. Thus, American Express Co. turned to dedicated Symbolics processors that communicate with conventional mainframes to build and run its credit card transactioo approval system. Amex estimates that the system, which examines a customer's spending trends before approving a purchase, saved it $27 million in 1988.

Cambridge Technology Group has reportedly developed a generic gateway technology that allows it to integrate an expert system — or virtually any computer technology, for that matter — with any conveotional application, regardless of the environment. Expert systems integrated by Cambridge are running a telemarketing system at Maryland National Bank and a commodities trading system at a major food processor, according to Cambridge Chairman John Donovan.

Whichever approach is taken, the task of integrating expert systems will almost certainly become easier as vendors work to make their interfaces more and more seamless.

personnel, payroll, benefits and pension system that has been very difficult to get information into on a paper basis," explains Reid Kaplan, a senior applicatioos specialist at Yale. To make it more complicated, this human resource system is linked to other Yale applications, rangiog from the university's general ledger system to its parking control system. As a result, Kaplan says, the process of entering all the data the system needs in exactly the right format has been "expensive and full of grief."

Yale's expert system front eod, built with a mainframe-based development environment from Palo Alto, Calif.-based Aioo Corp., tremeodously simplifies data entry, he says. Whereas the system once asked a full range of detailed questions on each person entered into the system, it now filters out irrelevant questions and ones to which it already has answers. Thus, it woo't ask for the union status of an employee that is a manager, nor will it ask if a 30-year-old professor is retired.

Kaplan contends that such expert systems modules are the only alternative to scrapping organizations' huge investment in existing hard-to-change applications. "Users have invested a lot of time in learning how to access the information. That makes it difficult for MIS to change the database — unless we make it easier to use. By adding intelligence, we're getting a midlife kicker for old-line systems," he says.

One area not yet widely addressed by expert systems is that of the core processing of large commercial applications. "Deeply embedded expert systems programs will be a growing area of importance," Cigna's Schelm explains, "but it hasn't been explored to a great extent." There is ample incentive for exploration, however. An expert systems program is typically 10 times as inexpensive to build and maintain as a functionally similar conventional Cobol program, according to Aion President and Chief Executive Officer Harry Reinstein.

As the trend to bring expert systems into mainstream IS continues, it will become harder — and potentially costlier — for IS managers to ignore the technology. ♦

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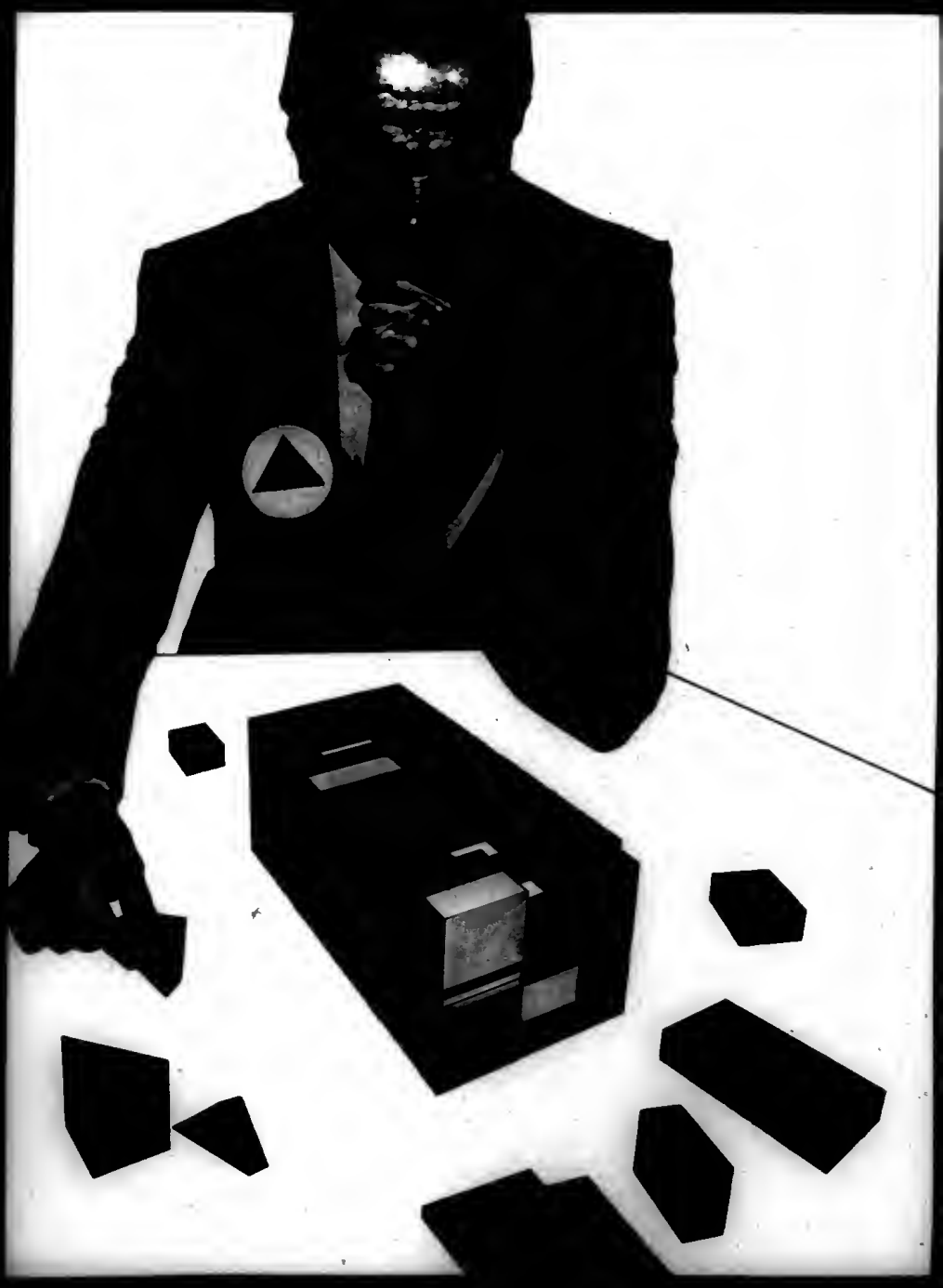
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Circle Reader Service Number 15



Are systems integration firms offering the best solutions or just pushing their own products?

A QUESTION OF bias

BY STAN KOLODZIEJ

NOT ALL CONFLICT of interest issues are coming out of Washington, D.C., these days.

Some information systems professionals are calling into question the integrity of the systems vendors with which they are conducting their integration business. Such doubt centers on the ability of systems vendors to offer corporate users the best solutions, without product bias.

How are IS professionals coping with the dilemma they find themselves in?

"I believe that many large companies like ourselves have reached a crucial stage in their IS development," maintains Gopi Balija, director of strategic systems development at Ogilvy & Mather, an advertising firm in New York. "Integration is important because it's not just putting hardware and software together, it's part of a larger look at where IS is going — to multimedia environments, what I would even call hypermedia environments.

"The IS manager has to pull all of this together from several sources. If he relies on one or two suppliers, he will fall short," Balija says.

The vice-president of information management at a large Northeastern bank says that any integrator must first have a strategic fit with the bank's architectural framework and must also be open to third-party vendor equipment. Citing more control over integration installations, the bank vice-president says he would prefer, if possible, to stay with a systems vendor to supply most parts of an integration plan; however, he also adds that that policy is never written in stone.

"One time recently we rejected one of IBM's arguments that its mainframes could handle heavy [data] throughput and went instead to Arthur D. Little to configure a hardware and software solution," the VP says. "At the same time, we let NCR handle a bank automation system using its own integration plan and components. In one case, we went outside to a professional services firm; in the other, we stayed with a systems vendor to supply everything."

Balija says that IS should be wary of vendors promoting their own systems over better solutions that can be found and melded.

And he is not alone in his thinking. A recent study involving several New York-based Fortune 100 firms produced some interesting findings.

The members of the study, conducted by the Ledgeway Group, Inc., a Lexington, Mass.-based research organization, agreed that most hardware or systems vendors approach professional services projects with a product bias. No mystery. However, the study participants said that because of such product prejudice, they were reluctant to use systems vendors for integration design proposals, feeling such bias would limit the design's scope. For actual implementation proposals, however, the study

FABIAN BRUSH

participants were very keen on using systems vendors because the vendors would be the most knowledgeable and skilled in installing their own products.

There's more: Study members also saw demand for outside professional services growing in their IS facilities as information systems become more complex, as end-user needs become more complicated and as in-house staff becomes more limited.

The downside, however, is that the respondents to the study said they felt systems vendors lacked the product knowledge and skills to cope in multivendor environments, which is the bread and butter of systems integration work.

As would be expected, systems vendors bristle at such findings. David Creed, corporate marketing manager for systems integration and professional services at Digital Equipment Corp., wants to set the record straight.

"Our programs rarely, if ever, include 100% Digital products," Creed says. "We commonly deal with multivendor environments. ... That's the way the industry has changed.

"I don't think any [systems] vendor is going to give any customer 100% saintly objectivity. We have products that we want to sell, and so do many others. What the customers watch is the bottom line, and I don't think they care where they get that help from, product bias or not," he explains.

That's true for George Timchal, technical specialist at Scott Paper Co. in Philadelphia. Timchal is pondering how his company can integrate the IS functions of two recently purchased companies to form a third business unit. The project will involve integrating multivendor environments.



Scott Paper's Timchal is wrestling with multivendor integration.

What Timchal wants is a conceptual vision of where the new business unit's information systems should go, not just the usual data on the physical linking of software and computer equipment. To that end, Scott Paper has approached four companies, including two systems vendors, a telecommunications company and a consulting group, and has asked them to supply that vision. The company hopes to decide on one of them soon.

DEC's systems integration strategy, as well as that of other systems vendors, is in large part aimed at securing existing installations and retaining account control. New systems integration business, however, is also going to hinge on capturing the design and implementation phases of the business.

Filling in the blanks

Systems vendors have been acting to fill in the blanks in their strategies. Many have chosen to buy independent professional services firms to gain credibility among integration customers. Nynex Corp. is a good example of this trend: During the past few years, the telecommunications provider has acquired AGS Computers Ltd., a software services company; BIS Ltd., a British consulting firm; Telco Research, a telecommunications management company; and Data Group, a field service management systems vendor.

By its very nature, systems integration tends to be less hardware-driven. Instead, it places a much greater emphasis on software and other value added such as service and maintenance facilities, explains Clare Fleig, director of research at International Technology Group, a Los Altos, Calif., research firm.

Ironically, however, if systems vendors have a weak spot, it's in providing leading-edge software solutions. In that increasingly crucial area, professional services firms

CRITERIA FOR SELECTING SERVICES FIRMS

- Proven track record.
- Technical expertise.
- Project management expertise.
- Multivendor integration skills.

Information provided by the Ledgeway Group



"If IS relies on one or two vendors, it will fall short."

Gopi Balija, Ogilvy & Mathar

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such as Andersen Consulting, Arthur Young & Co., Price Waterhouse, Software Design Associates and Arthur D. Little have been eating systems vendors lunches.

The perception of product bias and software weakness might prove a difficult combination to overcome for systems vendors.

Strong follow-up

If systems vendors are stumbling at the design and software front ends, however, they could make up for this potential impasse at the back end of integration: service and maintenance, two areas that are carrying a heavier weight in IS departments.

These areas are good avenues for systems vendors to gain new integration business as well as maintain account control.

IBM, DEC, Hewlett-Packard Co. and other systems vendors are offering blanket service and maintenance coverage for their own products as well as other vendors' equipment and software.

IBM is a good example of how vendors are working to dispel the perception of product bias. The company has been aggressively promoting its networking service plan through which IBM becomes the focal point in servicing its clients' networks, whether those networks belong to IBM or not.

According to a spokesman, the company recently purchased Spectrum Services, a division of Pacific Telesis. Spectrum has provided the technology for network probes, or monitoring software, which IBM operates from five service centers in the U.S. Such probes, IBM claims, can detect problems in multivendor networks before they happen.

In-house talent

But not all large companies are concerned with product biases fostered by some systems vendors and professional services. They are lucky enough to have skilled staff in-house to make integration decisions that are best for them.

James F. Sutter, vice-president & general manager of Rockwell Information Systems at Rockwell International Corp. in Seal Beach, Calif., has approximately 3,000 people working in software and applications development. The cotopany has created a Software Engineering Center to evaluate incoming software and is actively involved to computer-aided software engineering and artificial intelligence research.

As Sutter understates: "I think we can say that we've had a very small dependence on third parties for systems integration." ♦

DIFFERENCES IN INTEGRATION PROJECTS ADDRESSED BY IN-HOUSE STAFF VS. PROFESSIONAL INTEGRATION FIRMS

IN-HOUSE PROJECTS

- Short term, usually lasting six to nine months.
- Simple, requiring minimal custom programming or configuration.
- PC based.
- Unique, giving proprietary or competitive value.
- Mandated by corporate.

OUTSIDE PROJECTS

- Long term, usually lasting over nine toonths.
- Complex, involving multivendor integration and extensive custom programming.
- Minicomputer and mainframe based.
- Low visibility and impact.
- Politically sensitive.

Information provided by the Ledgeway Group



"I think we can say that we've had a very small dependence on third parties for systems integration."

James F. Sutter, Rockwell International

WHY NETWORKS **fail**



BY AVERY JENKINS

GO AHEAD. SLEEP TIGHT thinking all's right with your network. Don't think about the political mine field that is threatening to blow between the IS department and users who want data access. Don't think about the hidden costs that may crop up after your networking budget has been OK'd. And certainly don't think about whether your network is vulnerable to attack from those insidious little viruses we've all heard so much about.

Don't think about these possibilities, and you may be writing off your company's network investment.

Not everybody realizes the importance of their networking systems at first, as Pat McGuffie, manager of business communications and network planning at Champioo International Corp. in Hamilton, Ohio, discovered.

McGuffie manages both the voice and data networks for Champion, a paper manufacturer with plants in several geographically dispersed locations.

JENKINS is a free-lance technology writer based in the Boston area.

McGuffie says that politics created networking problems for him in part by inhibiting his ability to prepare for the future. In previous years, McGuffie says, he has had to fight for the funds he needed to keep his operations apace with existing user demands.

Because of Champion's previously tightfisted budget policies, McGuffie was not able to expand the company's network enough to meet projected demand. Three years ago, upper management "didn't give us the money to do those things," he says.

Those policies have left McGuffie in a position of playing catch-up as usage has increased. But because communications has, in his words, become "a high-ticket item," he has been given a larger budget to meet the ever-increasing demands.

But as many before McGuffie have discovered, fame brings its own set of problems.

Champion's data network "has become so increasingly important that it has become a 'jewel' " that many want to control, McGuffie says. Turf wars have erupted between various interest groups.

For example, McGuffie



IRV BLYTHE, *keeper of Virginia Tech's campuswide network, advises IS managers to be very specific in stating network needs.*

says, in some cases, IS computer analysts have attempted to establish their own communications links for some new applications rather than relying on the existing network that they consider outside their control.

Bill Yundt, director of networking systems at Stanford University in California, has also seen the political infighting that sometimes accompanies networked systems. According to Yundt, data networking got its start at many companies at the PC level technologically and the department level organizationally. With the growth in importance of networks and departments' need to interconnect, the fight for network control began.

REASON #1: POLITICAL INFIGHTING
Turf wars can get in the way of network success as various interest groups fight to gain network control.

McGuffie says he is fortunate in that the responsibility for telecommunications and data communications has always rested within the IS organization. The rivalries are occurring only within the MIS department itself, he says, keeping the network wars on an intramural level.

At many companies, though, the telecom department often reports to the chief information officer or financial arm of the company rather than to the IS department. As a result, fierce political battles are waged as IS, seeing itself becoming dependent on telecom networks, fights to gain control over that function.

Where'd that come from?

But politics isn't the only obstacle to networking success. Networks can contain hidden costs that companies should plan for, both users and consultants agree.

According to Bob Dantowitz, a principal of the Index Group, Inc., a research company in Cambridge, Mass., hidden costs can crop np because of poor capacity planning.

Irv Blythe, director of communication network services at Virginia Polytechnic Institute and State University in Blacksburg, Va., agrees that the more specific the plans are, the less likely managers are going to encounter hidden costs.

Virginia Tech is in the middle of a five-year project to wire the entire campus with data, video and voice networks.

Blythe says that before any work began, the university's task group outlined its requirements very specifically. The school also studied other large-network installations, both successful and unsuccessful.

"In most of the cases where the projects became disasters, we found ... they were places that didn't know what they wanted," Blythe says.

Even if network capacity is correctly projected, however, managers frequently underestimate the costs of the personnel required to implement, maintain and administrate the system.

According to Algis Leveckis, a managing associate at the Index Group, up to 50% of the five-year operating costs of a network goes to personnel, while only one-third of those costs comes from acquiring the network.

For example, by the end of 1988, Virginia Tech's widespread campus was equipped with approximately 6,000 integrated voice/data connections, according to Blythe. As the project got under way, Blythe saw his staff grow almost exponentially.

By last summer, the networking staff grew to an all-time high of 230 people, Blythe says. Fortunately, after the physical installation was complete, that number dropped to 90, which is the level Blythe expects to maintain.

Part of the reason for the explosive growth, he explains, was because the university chose to lay all nf its own cable, which includes fiber-optic, coaxial and twisted-pair media. This turned out to be the only way in which Blythe could ensure the quality of installation he required.

At Virginia Tech, Blythe was prepared for the explosive growth in personnel. But even a well-specified network plan and a good grasp of the people required to run it cannot prevent communications professionals from encountering hidden costs that are out of their control.

Like Champion's McGuffie, Tim Taylor, who is manager of network services at Compass Computer Services in Carrollton, Texas, is facing a steady increase in the traffic on his network.

Compass operates the nationwide reservation network for companies such as Hilton Hotels and Budget Rent-A-Car, the car rental agency. The network is a point-multipoint setup, Taylor says, with most traffic being one-way from a central location. With such a geographically widespread network, Taylor is very dependent on telephone lines — a dependency he is now fighting because of increasing tariffs.

"The uncontrollable cost is in expensive, terrestrial multipoint circuits," Taylor says. "Several times a year, [tariffs] can change."

One of the options Taylor faces is not to expand the network and allow response time to degrade. But the companies that use Compass' services depend on a rapid response time, and when the system slows down, "sometimes they get pretty upset," he says.

Taylor's long-term solution is to get control over his wide-area transmissions by moving from a terrestrial network to a satellite-based very small aperture terminal transmission system. He says that substantial transponder space is already available, which has made satellite transmission relatively inexpensive. And with the NASA space shuttle program back in operation, the launch of additional satellites will ensure continued low costs, he explains.

Another way in which networks

can go wrong is lax security. The recent spate of viruses, including the much-publicized one that infected Arpanet and other networks, as well as the increase of hacker invasions have made many companies concerned about the security of the information going across the corporate data channels.

In addition, the accusing finger has been pointed in many cases at the networks themselves as the weak link in the security chain, which leaves IS network managers in a bind.

Networks, Leveckis says, are increasingly being used to provide communications outside of the organization. However, at the same time that networks need more open access, they also require increased security.

At Virginia Tech, Blythe operates an open network that does not contain built-in security. Instead, he says, each computing site is responsible for developing and maintaining its own security.

McGuffie's approach to security at Champion is somewhat different. "Our network is fairly secure. It is self-contained," he says, explaining that the only direct dial-up ports from the outside are through a value-added network. But even that has its own security.

In spite of the recent reports of hackers and viruses, many information systems executives and consultants don't see a need to beef up network security.

In fact, according to the Index Group's Dantowitz, the concept of network security is often seen as a contradiction in terms.

"The network is there to help people get in," Dantowitz says. Managers can't think of security "in the sense that they want to keep people out."

And several IS professionals claim that the reason the recent Arpanet virus was quelled so rapidly was that investigators were able to trade information quickly over the very same network that spread the virus in the first place.

A more important problem, according to Dantowitz, McGuffie and several others, is that of disaster recovery and reliability. These are more likely to be points of drastic network failure than security problems, they say.

REASON #3: LAX SECURITY

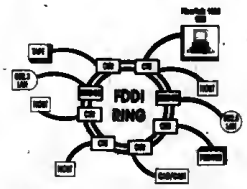
"It can't happen to me" is one reason to go without network security — until your network crashes.

But these problems require that network managers go outside of their own organization and to the IS department and user groups to ensure that proper procedures are developed and followed.

In other words, McGuffie says, "the solution to communications problems is communication." ♦

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caseing THE JOINT

BY STAN KOLODZIEJ

IN 1984, WHEN Pat Guidash first brought a computer-aided software engineering system into his company, he says the shock waves could be felt all the way to upper level management.

"I had given my [CASE] expectations to management and my staff," explains Guidash, who is director of systems development at Wilmington, Del.-based Hercules, Inc., a supplier of parts to the aerospace and automotive industries, "but we were overly optimistic. Our learning curve turned out to be a lot longer than we thought."

CASE didn't make an easy first ride for Ed Lipson, either. The New York Bank assistant vice-president of the IS planning division and his colleagues were told in 1984 that a CASE tool would be introduced as a code generator that would cause little disruption to the development of banking applications.

"Instead, we got culture shock," Lipson says. "We tried shoehorning the old data design into the CASE format. We weren't prepared for it [CASE]."

Not many companies *are* prepared for CASE. And they need to be because CASE is playing a crucial part in companies whose resources are becoming increasingly connected.

Because such CASE systems are being integrated into user applications, there is more pressure from users to run CASE across numerous hardware and software platforms as well as networks.

At the same time, CASE vendors are adding greater numbers of tools to their CASE arsenals, producing cradle-to-grave systems that can take customers through complete series of application life cycles and even back through the reengineering of existing programs. To leverage future sales to installed bases and establish account control, CASE vendors are pushing these bigger, more complete systems at customers, promoting one-stop CASE shopping.

The bigger the CASE systems become, the greater will be the difficulty in integrating them into the traditional setup of the MIS shops.

Under these conditions, preparing for CASE is essential.

Barbara Bouldin, author of *Agents of Change*, a book researching the impact of new technology on organizations, advises corporations against moving too quickly into computer-aided software engineering and causing major disruptions in IS.

She points to her own experience with CASE as a systems analyst for AT&T.

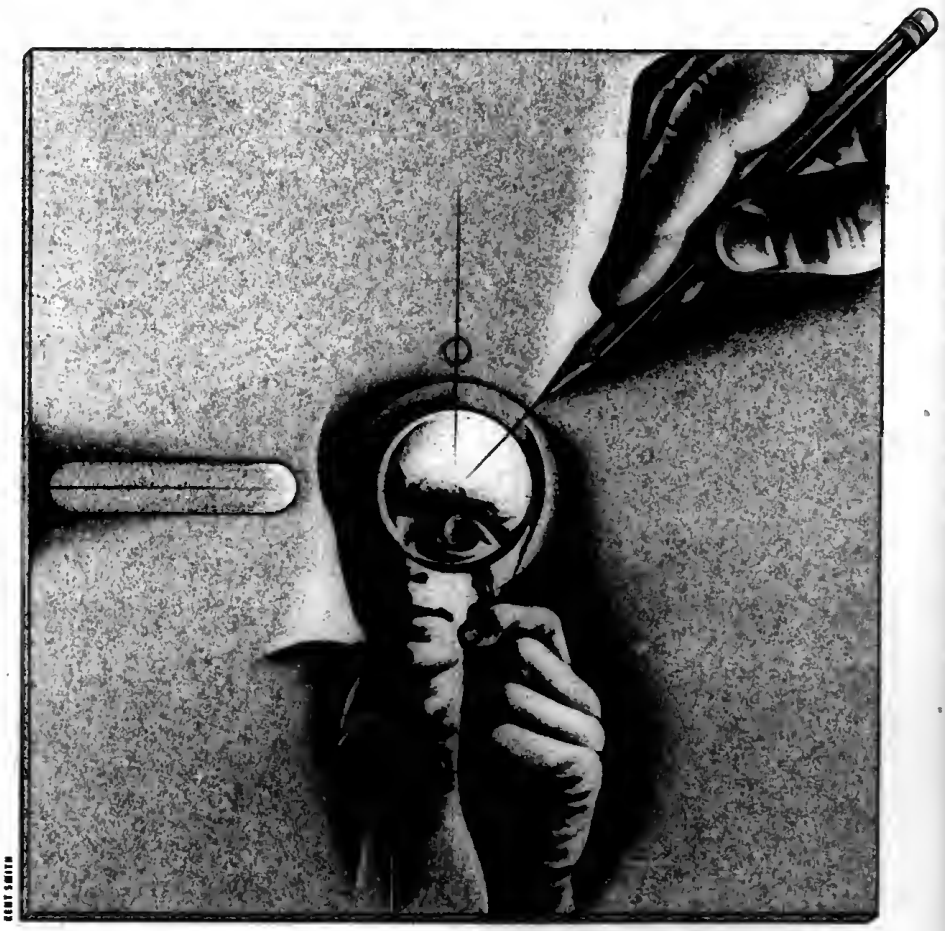
"We knew it would be more beneficial to take the extra time and make the [CASE] tool fit our existing methods than the other way around," Bouldin says.

That also applies to people.

"Users are comfortable in their positions," she explains, "but I've seen so many situations where the first thing companies do when introducing new technology is initiate changes" that directly affect the way people do their jobs.

And don't expect much help from CASE vendors when it comes to integrating CASE in the corporate environment, Bouldin says.

"There is pressure from users for [CASE] vendors to supply more than just tools, but any consulting that vendors offer will deal with technical areas like structured methodologies," Bouldin explains.



SCOTT SMITH

"The agents of real environmental change have to be created from within the corporation."

Suzanne Niedzielska, CASE project manager at the Travelers Cos. insurance firm in Hartford, Conn., agrees. "I think buyers' expectations of CASE are in some cases unrealistic," she says. "The technology cannot yet deliver a solution that fits every systems project team or application."

Laying the groundwork for CASE may help make its acceptance easier.

In the meantime, Niedzielska maintains that a large company without an entrenched development or maintenance methodology, which CASE can automate, is in for a long haul. "Without such methodology, the management direction and support and the [programming] cultural change required with CASE are going to be a more substantial investment," Niedzielska says.

Vendors are trying to provide more than just tools. Melvyn Bergstein, managing partner of technical competence at Andersen Consulting in Chicago, says CASE is not just about design intent but must also be integrated into the shape of the client's business.

"But I agree that there is a lot of work to be done," Bergstein says, concurring with Bouldin's assertion that

the onus is on IS departments to get themselves ready for the changes that CASE will bring.

In the meantime, Bergstein says, CASE users need to see the fundamental change in perception that CASE entails, which is to emphasize data administration. "MIS will assume different roles," Bergstein explains. "They will become keepers and administrators of the [systems] architecture. The days of that tough MIS attitude that only real men write their own code are fading."

There might be some imminent changes in the CASE arena, however, that could better instruct MIS in how to lay the groundwork for CASE.

More CASE vendors are looking toward the concept of the Integrated Project Support Environment (IPSE). IPSE emphasizes the integration of CASE tools and puts a premium on team approaches to software development and methodologies, something that the Europeans and Japanese have been promoting

NEW YORK BANK'S ED LIPSON *says lack of preparation for implementing CASE meant the bank got culture shock rather than code generation.*



JOHN CHASSON/KAMBA LIAISON

LAYING THE CASE GROUNDWORK

BARBARA BOULDIN, author of *Agents Of Change,* gives the following advice to lay the groundwork for computer-aided software engineering:

- Assess the need for CASE. Many companies bring in new technologies without a firm understanding of the corporation's needs for that technology.
- Evaluate the computer-aided software engineering product carefully, possibly in a pilot project, before it is formally integrated.
- Present the product to upper level management and show what it can do. Bouldin says senior management has come full circle on CASE in the '80s, going from skeptical to overly enthusiastic and back to skeptical. Showing is believing.
- Present the product to users and show how they will derive direct benefits from CASE. Afterward, go back and canvass users on their thoughts and ideas for improvements on CASE policy.
- Look for potential agents of change. CASE doesn't always have to involve just IS staff, Bouldin maintains. Valuable CASE support can come from other personnel, including users and senior management.
- Plan how CASE should be introduced to the corporation. At this stage, according to Bouldin, IS should have the representation and understanding of people from those areas of the company that will be affected by CASE.
- Introduce CASE quickly but incrementally once the skids have been greased, so to speak. CASE should be aimed at software projects that will have a direct impact on user/programmer productivity. Quick, hard results will establish long-term corporate support for CASE.



BARBARA BOULDIN *says agents of change can be found in unexpected places — among users and senior management.*



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for years. U.S. vendors' strengths, on the other hand, have traditionally been in individual CASE tools and not in the project management capabilities that IPSE embodies.

The coupling of IPSE with advanced CASE tools will make the introduction of CASE technology less disruptive to organizations.

But in the meantime, the burden is on IS staff to ease the transition to CASE. Both Lipson and Guidash, for example, say that despite their rough starts, their CASE work has grown very productive over the years.

There is inevitably some price to pay up front when you introduce CASE, Guidash claims, but it's a necessary price. In the end, it's better to have some CASE than none at all.

"My vision for CASE is a vehicle where I can sit down with a user and go over the conceptual design and analysis of a program, then have the code come out the back, without any need to wring it out with fourth-generation languages or anything else," Guidash says. "There'd be no interruption from prototype to code."

Maybe IPSE will help bring that about, Guidash speculates, but why wait? "Bring in pieces of CASE now, get users and programmers accustomed to what it is," he says, "and you'll make the CASE transition smooth."

And while what you deliver with CASE doesn't have to be big, it at least has to be useful, Bouldin adds.

"It can't be smoke, and it has to be done fast to keep interest alive," she explains. If you follow such advice, she maintains, you will lay a strong foundation for CASE that will give you executive and user support for years, not just months.

Lipson, who says the Bank of New York has now completed about 20 major banking applications using CASE, says a firm systems programming methodology should be in place before CASE is brought in. "CASE strengthens methodology."

And if he were just introducing CASE into his corporation today? Lipson says he would apply an important lesson he learned the first time around: Downplay the technical merits and sell it as a tool that will decrease drudgery. "Everyone understands that," he says. ♦



ANDERSEN CONSULTING'S BERGSTEIN *says CASE will change IS' role to that of keeper of the system architecture.*

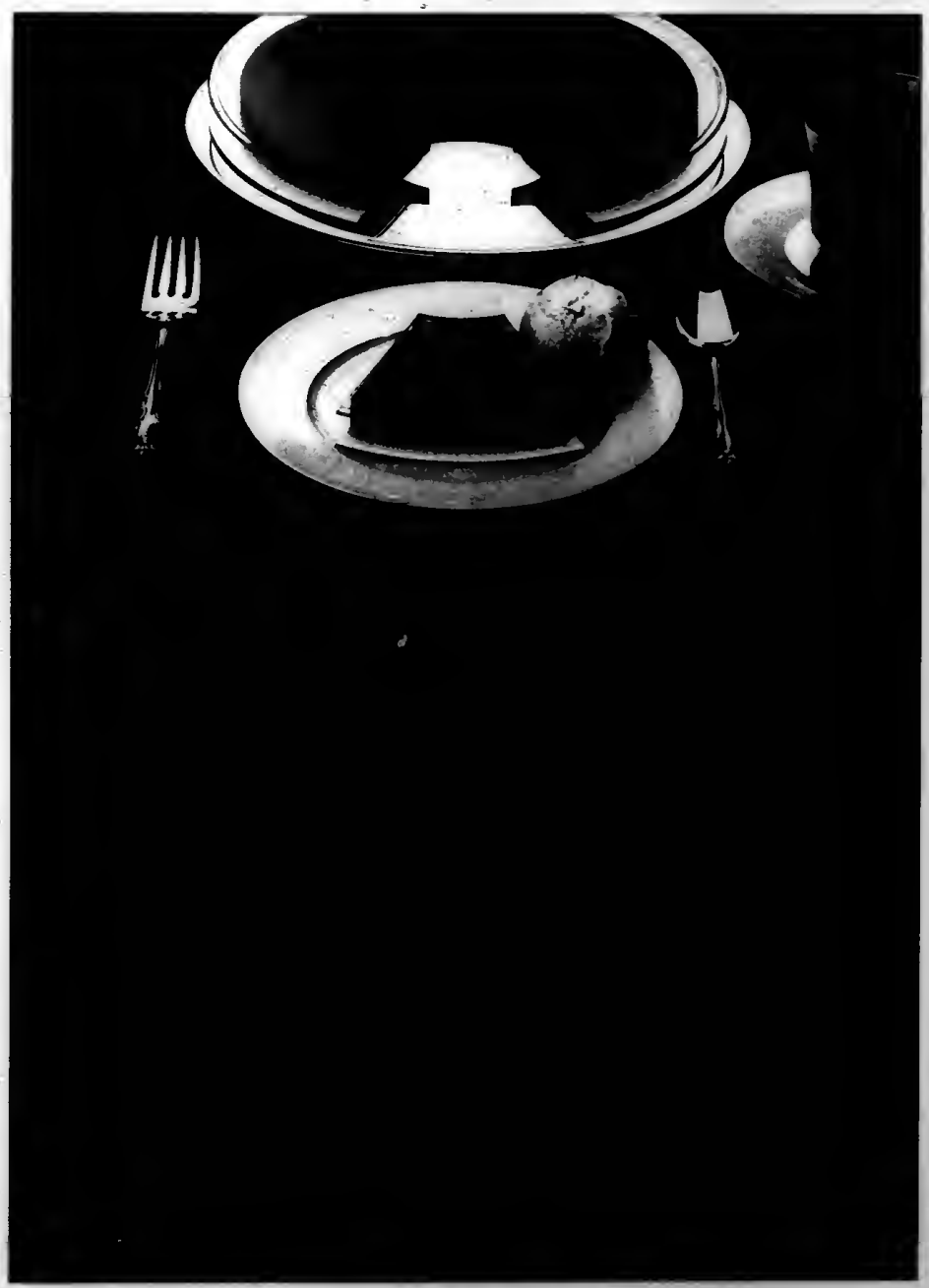
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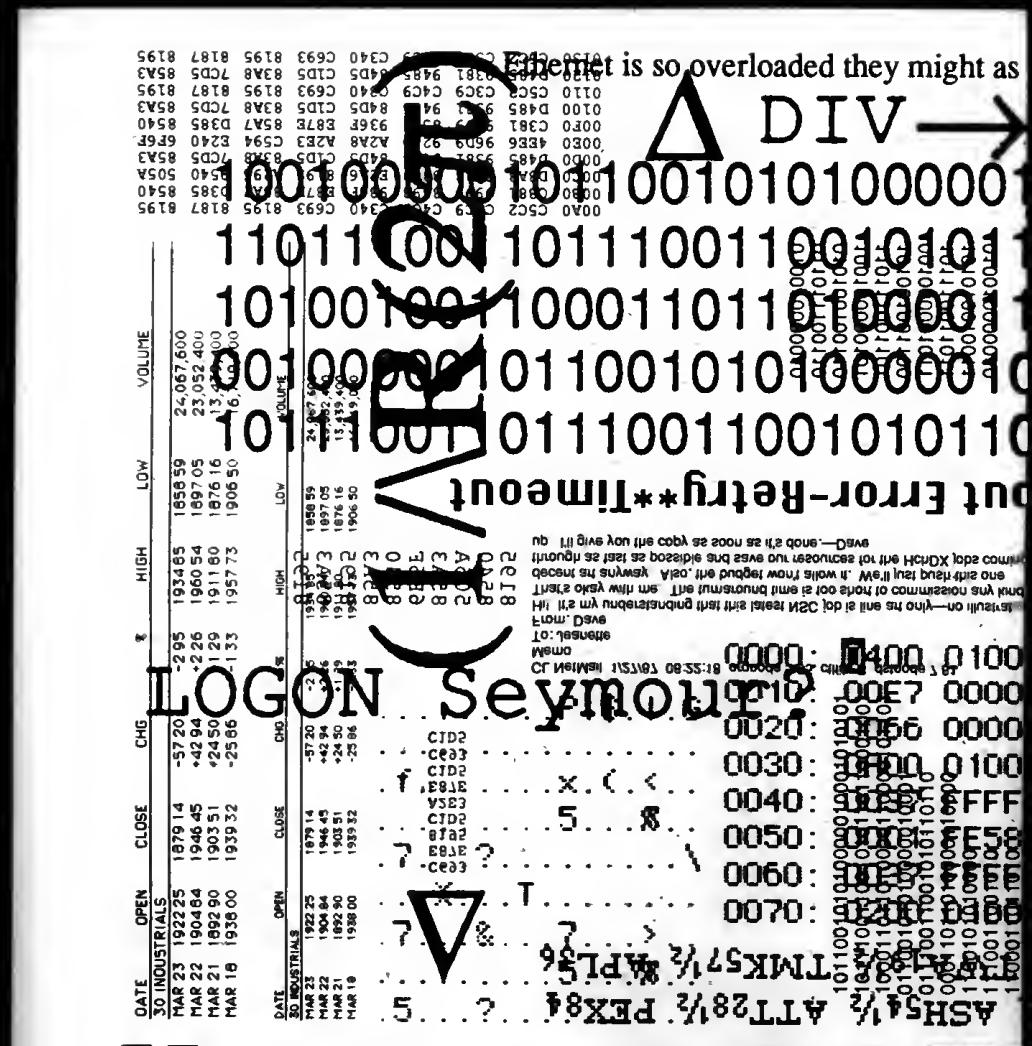
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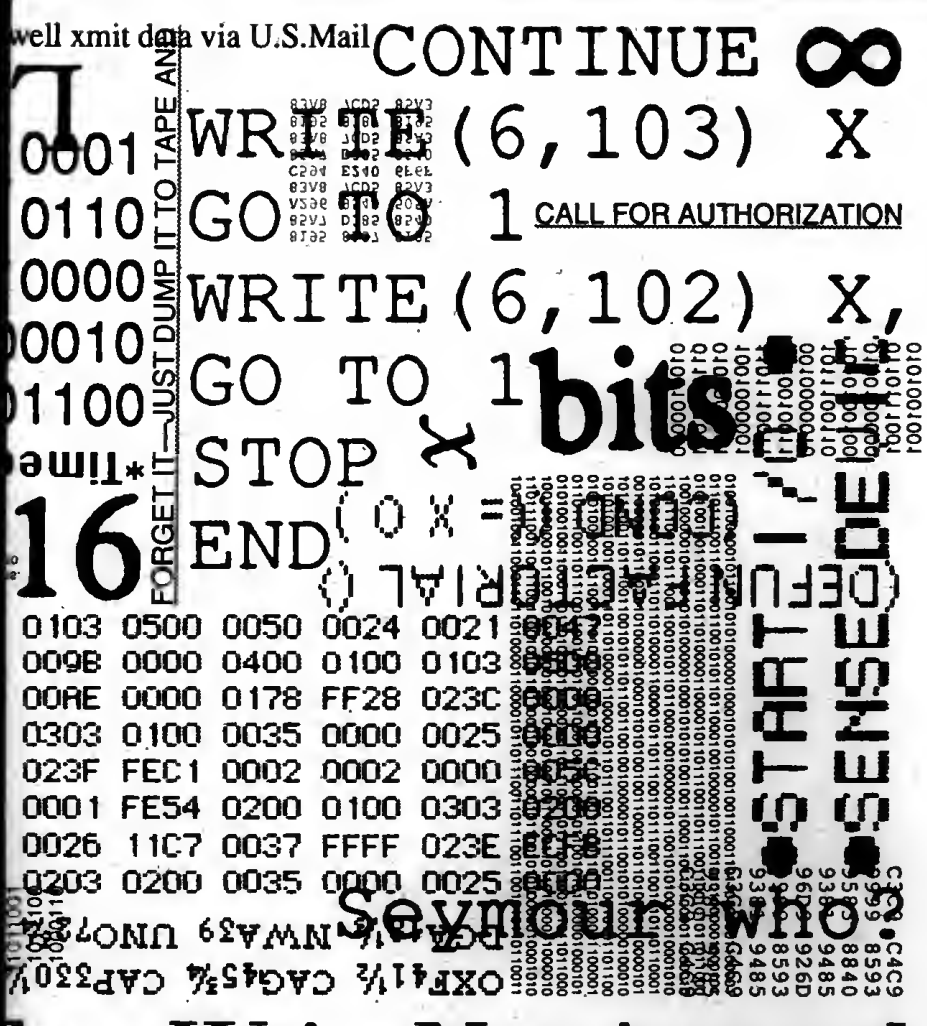
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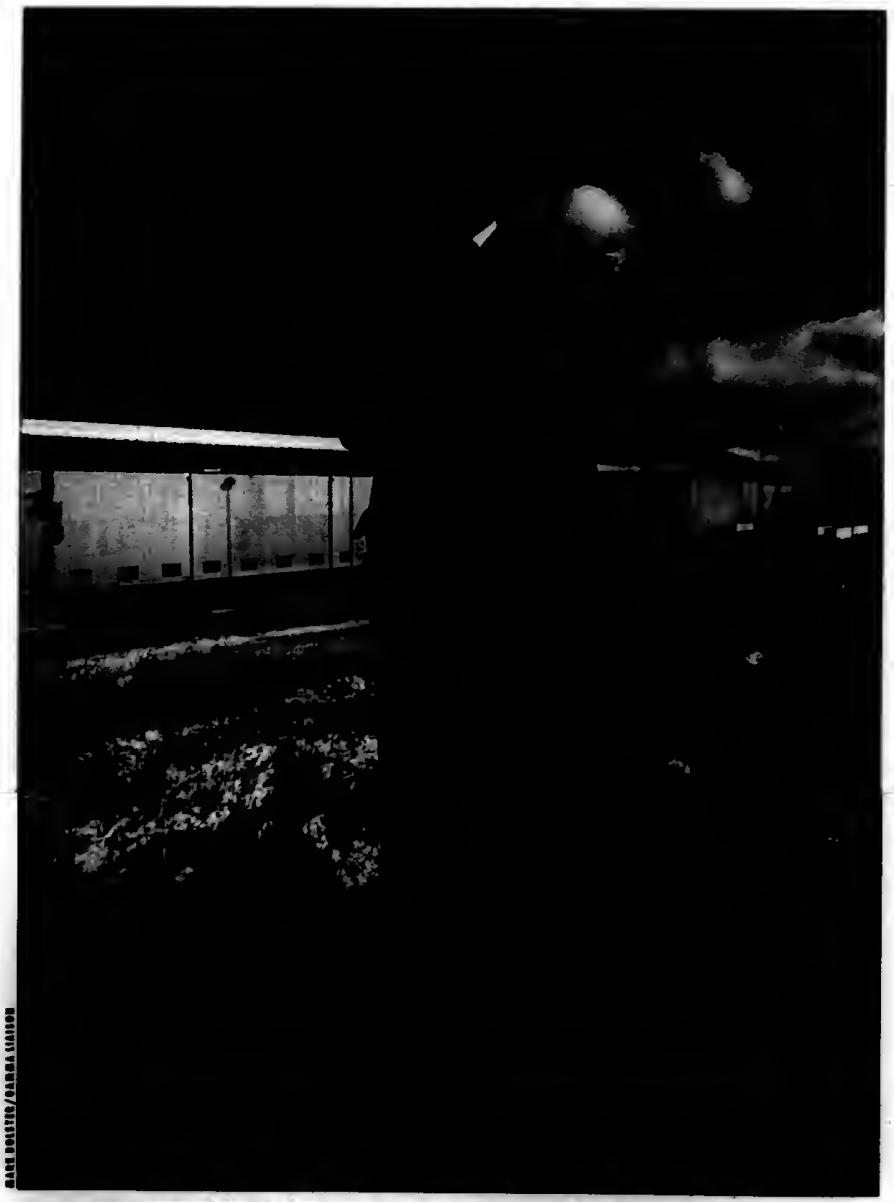
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ROBERT LOGSTON'S *expertise helped him forge steelmaker Timken Co.'s integrated data base success.*

FIT TO BE **tied**

BY MARK BREIBART

STEEL MILLS DON'T usually conjure up images of advanced technology. Their blackened stacks are far more often used to symbolize industrial decline. But Timken Co.'s Faircrest steel plant has turned that stereotype on its head. Not only does its integrated steel process turn scrap metal into speciality steel bars as efficiently as any plant in the world, but its computer systems tie together disparate databases in ways that other organizations can only wish for.

The needs of real-time computing in manufacturing may add a level of complexity that most companies are spared. But whether it is two machines, the payroll and personnel systems at corporate headquarters or a bank's deposit and loan systems, the issue is the same — applicatioo systems need to share data with each other.

If they don't — and most don't — departmental systems can cost the corporation money because they are acting in isolation. Or upper-level managers, trying to make strategic decisions, can get the relevant informatioo only after great effort, if at all. Methods such as electronic mail, file transfers or uploading and downloading are usually too ad-hoc and too fragmented to do the job.

At the Faircrest plant, Timken has managed to put it all together. The Canton, Ohio, maker of tapered roller bearings has built a pyramid-like computer system that both controls production and prepares informatioo for managers on all levels to help them fine-tune the process. Data flows sideways and up and down the hierarchy as automatically and smoothly as the steel itself moves from the railroad cars filled with scrap through the furnace and to the rolling mill at the end.

Integrating databases isn't easy, but it does have its rewards.

The idea, says Robert Logston, computer-integrated business specialist at Timken, is "to try to take steel-making from an art to a science."

For example, partway through the process, the molten metal is tested to see if its alloy content is exactly what the customer ordered. If it isn't, metallurgists at the plant-level computer get the results from the chemistry

lab's computer and scan future orders to see if the steel meets the requirements of another customer. If they find a close fit, their computer then updates all the process control computers on the plant floor with the specs for the new order.

But Timken's success is unusual. For most companies, there's no mistaking the dearth of integrated applications. In a 1987 year-end survey of about 100 large companies, 60% had corporate electronic mail, and 78% downloaded data from the mainframe to personal computers. Yet only 19% of these same companies said they had adequate integration of their databases, according to Link Resources Corp. in New York.

Companies are slowly beginning to do something about their systems hodgepodge, however, as a variety of forces push and tug them.

Pushing them is the drive for increased productivity and the cost savings that come when the left hand knows what the right hand is doing.

The impetus to integrate can come from outside.

Take Burlington Northern Railroad, for instance. The information system that tracks the engines the firm leases from an outside source wasn't linked to its repairs system. The costly results of such a separation? The railroad undertook a major repair project on one of its leased locomotives just as the contract for the train ran out, says Lynn Ruth Davis, the lead data administrator in Burlington's information architecture group. She was brought in to put together Burlington's diverse computer setups; her first project was combining the disparate locomotive systems.

Sometimes, the impetus to integrate comes from outside the corporation. Customers demanding electronic data interchange or consolidated billing statements, for example, can force a company to change its individual product systems.

With banks, regulatory ageocies require adequate loan-loss reserves as protection against customer defaults. For Affiliated Bankshares of Colorado, a $2.5 billion regional bank holding company, calculating the risk posed by any particular customer was a laborious, often manual process. Not only were customer accounts spread across the mortgage, commercial and personal loan systems, but each of the 29 member banks had its own system. Sue Osterfelt, the information resource manager for the bank's data processing subsidiary, says that a group is now collapsing all the loan systems and customer databases into one system to create a fast, reliable way to determine if and when loans will go bad.

Few organizations have the luxury of starting from scratch.

Despite the crying need for systems that work together, the obstacles can be daunting. The most pervasive problem, says William Inmon, senior principal at American Management Systems, Inc., "is that people, once having built systems, don't want to change them." And those systems, built application-by-application, "are fairly badly integrated," adds the database guru based in Lakewood, Colo.

Yet few companies have the luxury of starting from scratch. Timken did, because Faircrest was a "greenfield" steel plant — built on an empty field and completed in 1985. That's one reason its computer control system is so finely meshed together.

WHERE TO BEGIN? WITH A BUSINESS VIEWPOINT

WHEN INTEGRATING databases, forget about physical files, applications and methods of implementation and focus on the business view of data. While IS people can guide development, the source of an integrated data model should be functional managers, says Jim Funk, a data administrator who helped build a data model at Wisconsin Gas Co. in Milwaukee and has been hired by Johnson & Johnson to do the same.

For the first application to build within the model, IS staff should look for a project that is small and doable to convince the skeptics that IS can deliver, and quickly. They also should look for something that has had a significant impact on the business, because corporate officers will ask, "What's it going to do for me?" says Sue Osterfelt, information resource manager at Affiliated Bankshares of Colorado.

Finally, project managers need to get and keep users involved, from the design of the data model to the capabilities of the application. J. D. Welch, manager of decision support at Pactel Cellular in Irvine, Calif., may have gone further than most. He let users actually choose which SQL system they wanted to use on the decision support database he helped build from several production systems.



CORPORATE OFFICERS *look for business impact, Sue Osterfelt says.*



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CHILDREN'S HOSPITAL STARTS FROM SCRATCH

HOSPITALS HAVE LONG BEEN familiar with integrated databases — the paper kind anyway, with their color-coded medical record folders. Although they may have computerized their fiscal operations, when it comes to automating their core business, the clinical departments, hospitals have lagged far behind their business counterparts.

Children's Hospital in Boston is no exception, says David Margulies, vice-president of information systems. In the fall of 1986, he was hired with a mandate most corporate IS directors would envy — to develop an information system that would integrate the major functions of finance, clinical practice, research and administration.

The main reason for the hospital's change of heart was financial, Margulies says. Children's, like other medical facilities, has been running at a deficit for several years. Top management needed to track the use of every resource to determine its costs and benefits. But the hospital's fragmentary and aging computer system was not up to the job.

Essentially starting from scratch, Margulies chose his strategy: He decided to weave together departmental systems from a variety of vendors.

The pieces are tied together in two real-time ways that make information immediately available hospital-wide and that avoid batch updates. Certain events, like the registration of a new patient, are broadcast across a 4,000-node network to be picked up by any applications that need it. More detailed information is also automatically sent by each departmental system to a central database of all public hospital information.

Even though information systems is only in the middle of its three-year plan, many of the system's benefits are already apparent, Margulies claims. Departments that had never been automated, for example, now are and have become more efficient. And the clinical staff can track a drug from the moment it is ordered to the moment it is administered to a patient.

There also has been the "culturally transforming" impact of electronic mail, whose uses range from gossip to signing out patients to electronic discussions by the administration.

But you can't make them drink

Despite its successes, the system has run into the you-can-lead-the-horse-to-water problem. Thanks to the integration of departmental data, it is now possible to compare the costs of different therapies for a certain disease, a central issue for the facility from the beginning. But managers use the capability only sporadically, Margulies says. "Having an information system does not create the managerial will to use it."

While time may solve that problem, the information system has already hit limits elsewhere. Though it can identify the therapies that make and lose money, it can't tell the doctors what's right to do. It is easy to decide to do the medical treatments that are inexpensive and effective and those that are expensive but medically necessary, Margulies says. But there are many treatments in the gray, "ethically complex" middle, he adds. Those are questions no computer can answer.



JOHN BURR

DAVID MARGULIES *gathered together a variety of vendors' systems for Children's Hospital.*

For most companies, however, retrofitting is the name of the game. Unable to rebuild existing systems, yet unable to answer decision support questions with them, IS managers have few choices. One is to find or make a product that lets an analyst use data from different systems as if they were one, a kind of "know-it-all" interface. More commonly, they build a super database to extract data from the current, unmodified systems. It's not true integration, but it's doable.

Extracting, though, comes with technical and organizational problems. For starters, there is the connectivity issue of dealing with multiple hardware and software systems.

Even trickier is that users of different applications can interpret data elements in a variety of ways.

For Don French, manager of integrated decision support at General Electric Medical Systems in Milwaukee, "making data elements consistent has been the most painful piece" of creating a central information base. But without that step, he says, it would have been nearly impossible to analyze the expense of performing warranty work. "Finance gets its numbers from the general ledger; service and engineering get their numbers from another system. So the numbers often don't match, and there is no way to get back to the details because there is no automated relationship between the systems."

Extracting data is not true integration, but it's doable.

Overcoming vested interest

Equally common is the less objective resistance Doug Buchanan found when Dofasco Steel tried to implement a computer system in its steel plant in Hamilton, Ont. "We weren't just integrating databases, we were integrating departments and people," he says. Now that the system is in, says the manager of software services in an engineering unit, groups have learned to overcome feelings of vested interest in their data.

One of the reasons for such political resistance is that the sponsors of integrated applications usually come from the information systems side, not the business side. They are aware of the data redundancies and inconsistencies and of the difficulties of pulling together far-flung applications for management reports.

Integrating databases and applications is taking connectivity that last, often painful step. But acceptance can be refreshingly clear. As soon as GE's prototype of a warranty expense analysis system was ready, for example, other managers began clamoring for systems. French says he no longer has to worry about persuading the doubters; instead, he has to control expectations that are rising faster than he can handle. Everyone should have such problems. ♦

COMPUTERWORLD

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1989 Editorial Calendar

Issue Date	Ad Close	Editorial Topic*	Trade Show Distribution
Feb. 6	Jan. 12	Integrating the Network	Communication Networks
Apr. 3	Mar. 3	Connectivity & Standards	Comdex Spring
June 5	May 5	Network Management	PC Expo
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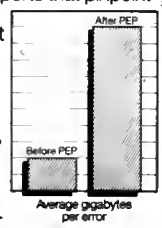


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MARKETWISE

Corporate networking grows up

By Stan Kolodziej

The big business network user is growing up. And it seems that many network vendors are going to have to do the same if they want to compete in the corporate networking world.

Peter Simon, vice-president of marketing for Banyan Systems, Inc., a Westboro, Mass., networking company, sees the corporate networking market forming into two tidy segments. At the bottom is the work group segment, which is distinguished by small local-area network installations consisting of five to eight network servers. The top level is the organizational networking market, and that, Simon says, is where all the corporate networking action is headed.



Organizational networking is the world of multivendor networks, standards, large-scale customized network applications, wide-area networks and large-scale data integration.

But the world of integration according to Banyan isn't that clear-cut. When Simon talks about this upper networking echelon, the product and marketing lines separating vendors such as DEC, IBM and Banyan begin to blur.

All vendors that integrate systems are on a big push to integrate and distribute databases: The network vendors look to software developers to provide the database tools, while the systems vendors look to communications companies to provide the network tools that will move the data more easily. Many tools, such as remote procedure calls and application programming interfaces, are part of the marketing weapons of various systems and networking vendors.

Both Novell and 3Com, for example, are buying and comarketing technologies that will help them become organizational networking forces in their own right. Even Ungermann-Bass is beating its chest as the organizational, or enterprisewide, networking company of note.

Networking vendors can basically make the same connections in multivendor networks, using basically the same tools. The big difference, however, will be in software-value-added from resellers and marketing.

That means a heavy marketing entry fee for all vendors of integration plans. Simon, for example, says Banyan is doubling the number of its value-added resellers, sales reps and service and support facilities.

Other network vendors are right behind it.



SIMON *wants Banyan to be a corporate networking force.*

CORNER OFFICE

The lean, mean money-making machine

By Sarah B. Kaull

Today's business challenges are different than those of the 1960s and '70s. Back then, an environment of easy growth, gentle competition and unsophisticated customers prevailed. Companies were structured to control growth, and this demanded the decomposition and simplification of activities at the local level.

But these narrow, fragmented organizational structures have resulted in a lack of responsiveness and flexibility within businesses.



Easy growth is a thing of the past; today's critical business issues are quality, innovation, customer service, responsiveness and "being easy to do business with." These issues transcend organizational boundaries; unfortunately, firms are still organized by specialized activity and not in a way that will permit the achievement of these key, pervasive goals. In fact, the typical corporation is a collection of independent business units loosely connected to each other. These piecemeal structures will not work in the current business environment.

How can companies pull together to work as a coherent whole with a shared focus on key business issues?

Information technology is the tool by which this necessary functional reconstruction can be achieved. A new type of system, the cross-functional system, can support multiple

continued on page 74

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ACHIEVERS

It's business as (un)usual for Big Apple CIO

By Mark Breibart

THE ISSUE
Rocked by a financial loss and a turnover in top management, the Dormitory Authority of New York needed a complete internal overhaul.

THE SOLUTION
The newly hired CIO used technology and a user-oriented philosophy to modernize operations and integrate isolated departments.

RON WOOLDRIDGE is not your typical chief information officer. Unconventionally groomed for his role by a stint in the Peace Corps and years as a statistician in the New York state office of mental health, he had never worked in an information systems department. But that was OK with Chris Richmond, newly hired executive director of the Dormitory Authority of New York, because there was nothing business-as-usual about his organization in the crisis-filled days of early 1983.

Late the previous year, the authority, a quasi-public agency that annually handles over $1 billion in financing and has over $3 billion in construction under way for public buildings like state universities and medical centers, had taken a financial bath. Lombard Wall, a government securities firm holding some of the authority's investments, had gone bankrupt. A new chairman was appointed for the authority, much of top management left and Richmond was brought in.

The disarray, Richmond recalls, was systemic: "The agency was run by senior management like a ma-and-pa organization, with no involvement of middle management." Its construction and finance departments lived in "totally different cultures."



DOER'S PROFILE: RON WOOLDRIDGE
Insight into management: *The corporation is a battleground between left- and right-brainers.* **On the CIO and his technical staff:** *Like the civilian control of the military — the secretary of defense should not be a general.* **How he relaxes:** *Hops into his Alfa Romeo, puts the top down and heads to Montreal to shoot snooker.*

Few construction managers knew, for example, that if they incorrectly estimated the cash flow needs for their projects, the finance people could lose money on investments by having to come up with the cash more quickly than anticipated.

In Richmond's eyes, building an information system — there was none at the time — was key to cleaning up the mess. "Unless you could provide managers with information from all areas, you couldn't ask them to affect the business positively."

For Wooldridge, the IS plan was a tall order, made taller by his atypical background as an end user, not a technical person. But today, the authority has systems in place for all essential requirements. Virtually all 220 employees have a PC or workstation connected to central Prime Computer, Inc. machines, and their software applications, which include electronic mail, desktop publishing, computer-aided design, project budgeting, investment management and critical path scheduling, are almost all linked together.

The key was that Wooldridge wanted a system that looked good from the desktop, not from the computer room. "Ask a computer person for a diagram of a system, and you'll see a big computer in the middle, with the users way out there on the edges. I see the user in the middle of the picture, and somewhere on the periphery is the technology that makes it happen."

To put together the initial plan, he spent his first few months on the job walking around, dropping in on people, learning what they needed. Together with Conrad Blickenstorfer (see box), his "resident technical genius," he next brought in small but useful PC applications to introduce

continued on page 74

A 'resident technical genius'



Conrad Blickenstorfer, the Dormitory Authority's director of information systems, is as atypical a systems person as his boss — he was trained in Switzerland as an architect. He says that he and Wooldridge spend "hours discussing Lotus, chips, boards and software." Where Wooldridge is the dreamer, Blickenstorfer says his strength is in figuring out what will work and what won't.

He is also responsible for putting the ideas into practice. "Ron is a master of selling concepts; I do the purchase, integration, implementation and dazzling demos to convince the user."

But just as important as the technical skill is that Blickenstorfer "finds the technology enormously exciting." As he went around the Dormitory Authority selling managers on computer systems, his enthusiasm was catching. Within a year of trying to get them involved, the users, with his help, have developed more than 50 interim applications.

CROSS SECTION

What has been your main obstacle to integration?

We asked the question above of IS professionals around the country. It looks like vendors need to get their compatibility acts together. Take a moment to compare the responses to your own experiences.



"One of the greatest barriers to integration is the lack of standards that cover at least a basic level of connectivity among our computing platforms."
ROGER BAST, DIRECTOR OF COMPUTING SERVICES, MIS AIR PRODUCTS & CHEMICALS, INC. ALLENTOWN, PA.



"Our main problem is achieving compatibility across vendors"
J. R. GARRETT, MANAGER OF TECHNICAL SERVICES FINAL OIL AND CHEMICAL CO. DALLAS

"We have a unique environment — Data General minis connected through a satellite network to corporate. Our major obstacles have been the processing protocols in an asynchronous environment"
DALE HELLER, ASSISTANT VP OF MIS SERVICE MERCHANDISE CO. NASHVILLE



"Vendors are dragging their feet on products that will help us integrate I've been trying to get our integration project going for 1½ years now, but the vendors don't have the products that can help"
PATRICK JOHN LEE DIRECTOR OF EDP TOWNECRAFT, INC. GLEN ROCK, N.J.



"The main obstacle to our integration plans has been the lack of end-user awareness of the value of integration as well as its complexity."
JOHN ERIC THOMAS, DIRECTOR OF INFORMATION SYSTEMS AND SERVICES JOHN C. LINCOLN HOSPITAL AND HEALTH CENTER PHOENIX

"I can sum it up in two words. vendor incompatibility."
PHILLIP CHAMBERS, DIRECTOR OF IS DIVINE PROVIDENCE HOSPITAL WILLIAMSPORT, PA.

ACHIEVERS

continued from page 73

users to the technology.

Once managers were interested, Wooldridge and Blickenstorfer needed a corporatewide system. At the core was a software package called Intact 50 from T and B Computing, Inc. in Ann Arbor, Mich. It tied together the finances of a project from the initial budget to final construction. And, most important for Richmond's management overhaul, it wouldn't work unless both the finance and construction departments used it. The package has "helped change the virtual autonomy of the organization that had contributed to its downfall," Wooldridge says.

Whatever the strategies and technologies, it takes the right people to implement them. What Richmond calls the "vision" and "evangelism" of his CIO were part of the project's success. But Wooldridge, a native of West Virginia, also has what Blickenstorfer calls "Southern charm," a trait that helped him in his role as a nonthreatening liaison between users and systems people.

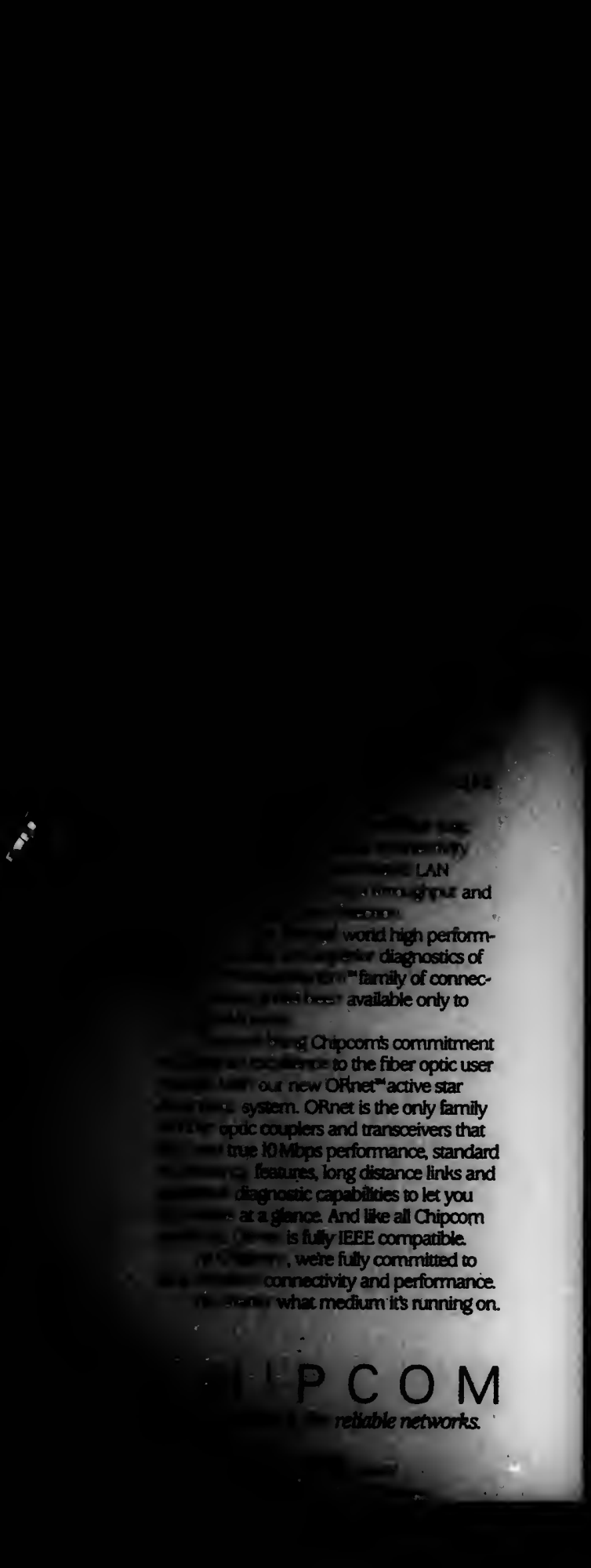
To take the current systems one step further, Wooldridge's pet plan is to provide an on-line users' guide of the buildings the agency constructs. Complete with everything from floor plans to maintenance specs for the air-conditioning units, the computerized manual would "take systems beyond being overhead to being what we deliver to clients." Not a bad plan for someone with no systems background.

CORNER OFFICE

Continued from page 71

business units and change the way they work and relate. Types of cross-functional systems include electronic mail to spread awareness; data interchange to ensure internal company consistency; shared databases to permit a common company vocabulary; and shared applications for the combination or integration of business functions. Cross-functional systems can rebuild a corporation to address contemporary business issues that transcend organizational boundaries.

KAULL is the associate director of the Partnership for Research in Information Systems Management, or PRISM, a joint venture between the Index Group, Inc. and Hammer & Co. PRISM, headquartered in Cambridge, Mass., does research for approximately 100 sponsors from Fortune 200 corporations.


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♦ *f r o m* ♦

SLOAN MANAGEMENT REVIEW

Winter 1989

Forces are at work that will bring about a revolutioo in the way we structure our organizations, but we may not be up to the challenge. There is a major roadblock to bringing about organizational change: We take hierarchy for granted.

From "Reassessing the 'divine rights' of managers" by Edgar Schein.

♦ *f r o m* ♦

SCIENTIFIC AMERICAN

February 1989

Computers based entirely on high-temperature superconductors are not feasible at this time. What is more likely, however, is a hybrid system that combines Josephsoo logic circuits and semiconductor memory, all operating at 77 degrees Kelvin. The system could be incorporated into parallel processing architectures for supercomputers that will be 1,000 times faster than those now on the drawing board. But for the near term, superconductors may be limited to interconnections linking ooe semiconductor device to another.

From "The new superconductors: Prospects for applications" by Alan Wolsky, Robert Giese and Edward Daniels.

♦ *f r o m* ♦

SLOAN MANAGEMENT REVIEW

Winter 1989

Business ethics and international economic competitiveness are inseparable. To strengthen our moral sense, ethical instruction needs to start in childhood, during which time we fortify our "ethical buttresses" — role models, codes of conduct and the honor system. Children should also study the past, including history and literature, from which our ethical standards come. Finally, we should realize that the good of society transcends that of any single company.

From "Ethics and competitiveness — Putting first things first" by John F. Akers.

♦ *f r o m* ♦

ISSUES IN SCIENCE AND TECHNOLOGY

Winter 1988-1989

Of the $95 million io federal funds for superconductivity research in 1988, $46 million was allocated to the Department of Defense, $27 million to the Department of Energy and $14.5 million to the National Science Foundation (NSF). The allotment for fiscal '89 is $135 million; it is expected to be parceled out in a similar manner.

However, money may not be enough in the face of international competition. To strengthen the U.S. position, we must give the NSF a larger role, put together industrial consortia with federal cost-sharing and form a national body for commercialization.

From "Bringing superconductivity to market" by Dorothy Robyn, W. Wendell Fletcher and John Alic.

♦ *f r o m* ♦

HARVARD BUSINESS REVIEW

January-February 1989

In the rush to automate, the next frontier is in marketing and sales. There are cases in which sales increases from technology have ranged from 10% to 30%, with return on IS investment exceeding 100%. But such systems cannot work miracles. They will not compensate for an inferior sales force, nor will they sell inferior products.

From "Automatioo to boost sales and marketing" by Rowland Moriarty and Gordoo Swartz.

♦ *f r o m* ♦

HARVARD BUSINESS REVIEW

January-February 1989

Women managers cost more to employ than men. Turnover is higher, and they are more apt to plateau or interrupt their careers. What increases women's cost to the corporation is not some inbred gender difference, however, but the clash of women's perceptions, attitudes and behavior with those of male-led corporations. With the increasing number of qualified, competitive women available for employment, how can businesses retain the best women while eliminating the extra cost of employing them? By providing them with opportunity, flexibility and family support.

From "Executives and organizations: Management women and the new facts of life" by Felice Schwartz.

♦ *f r o m* ♦

CALIFORNIA MANAGEMENT REVIEW

Fall 1988

To be effective in today's international business environment, firms must think globally and act locally.

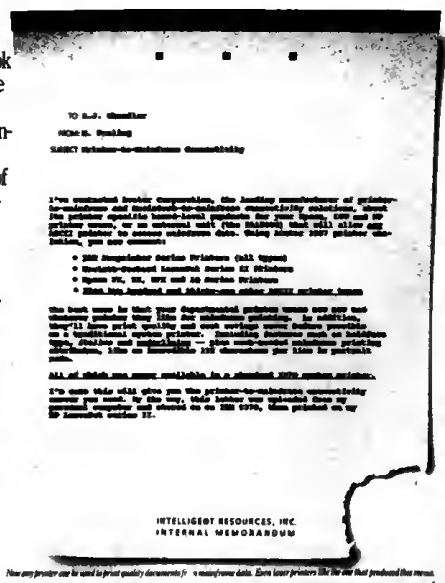
From "Organizing for worldwide effectiveness: The transnational solution" by Christopher Bartlett and Sumantra Ghoshal.

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On the road

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We're in luck. Wendy's International, Inc. and Visa USA, Inc. are combining communications technology in innovative ways to put a new twist on fast food and fast service.

At 14 Wendy's restaurants in Columbus, Ohio, customers can now use their Visa credit cards to pay for fast food purchases. The idea is called the Visa Express Payment System, and Visa USA got several communications players together to pull it off.

Twice a day, Visa USA shoots updated delinquent credit card data from its San Francisco head office, via its Visanet network, across the country to Alexandria, Va., where PBS Enterprises (a division of the Public Broadcasting System) transmitters are located.

Using the vertical-blanking interval transmission frequency (those horizontal black bands you can see rolling across television screens), PBS Enterprises zaps the credit data to a Communications Satellite Corp. satellite, which relays the data down to satellite receivers at participating Wendy's restaurants. The data then shoots along a tiny local-area network to a "hot box," as Visa calls it, which is basically a nondescript black box with enough memory to hold the bad credit numbers.

Wired to the box are terminals produced by Veriphone, Inc. in Redwood City, Calif. These are the devices that Wendy's clerks run customer credit cards through.

The bottom line? The entire transaction takes only two to three seconds. The terminal authorizes and records the transaction, dispensing with the need to imprint and sign the card, and there are no carbon-copy receipts.

Neat, tidy and fast. But will it play in Peoria? Wendy's officials are tight-lipped about the success of the project, how long it will last and about the future of the concept in the fast food business.

In the meantime, the clerk is telling me my credit card is invalid; I've exceeded my spending limit. For a $4 purchase. Life in the fast lane. — By Stan Kolodziej

Next wave

▸ Matsushita Electric Industrial Co. has reportedly developed a new type of Josephson junction that can control the maximum value of superconducting current and the size of the junction by changing the temperature distribution with a microheater. A Josephson junction is a voltage switching device that consists of a thin layer of insulating material sandwiched between layers of superconducting material. Because a JJ consumes less energy than conventional devices and needs less space for cooling, it promises the advent of smaller, faster computers.

▸ It seems that everybody's putting mainframe code on a chip.

This year, Unisys has announced its Micro A chip, a 2- by 2-in. package of mainframe-level computing placed in a desktop unit. Apollo has unveiled a workstation with reduced instruction set and parallel computing concepts set in silicon.

▸ Keep your eye on custom chip design systems. This technology will enable systems engineers to design specialized computer and networking applications right into the silicon.



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Computerworld Editorial Calendar

Issue Dates		Ad Closing Dates		Editorial Features			Trade Show Distribution	
Computerworld Issue	Computerworld Focus on Integration	Color (any) Executive Reports Product Spotlights Premium Positions	B/W Display	Special Features/ Executive Reports	Product Spotlights	Computerworld Focus on Integration	Computerworld	Computerworld Focus on Integration
Apr. 17		Mar. 31	Apr. 7	Executive Report; Business Executives Assess MIS				
Apr. 24		Apr. 7	Apr. 14	Executive Report: Managing After a Merger				
May 1		Apr. 14	Apr. 21		Network Management Tools			
May 8**		Apr. 21	Apr. 28	Executive Report: Automating the Data Center				
May 15		Apr. 28	May 5		Manufacturing Technology			
May 22		May 5	May 12	Executive Report: Restructuring MIS — Distributing Resources				
May 29		May 12	May 19		Printers & Plotters			
June 5	(Ad Close: May 5)	May 19	May 26	Special Feature: Systems Integration Executive Report: Workgroup Computing		Integration Themes		PC Expo
June 12		May 26	June 2	Executive Report: Technology Issues in Downsizing				
June 19		June 2	June 9		Micro DBMS		PC Expo	
June 26*		June 9	June 16	Executive Report: Restructuring MIS — Organizational Impact of Downsizing				
July 3		June 16	June 23	Open				
July 10*		June 23	June 30		Software for IBM Midrange			
July 17		June 30	July 7	Section Feature: Networking — The Human Side of LAN Use				
July 24		July 7	July 14	Executive Report: Restructuring MIS — New Organizational Models				
July 31		July 14	July 21	Section Feature: Systems & Software — Preparing For Cooperative Processing				
Aug. 7	(Ad Close: July 7)	July 21	July 28		The Mac Market	Integration Themes		Networld
Aug. 14*		July 28	Aug. 4	Section Feature: Management — IS For Flattened Organizations				
Aug. 21		Aug. 4	Aug. 11	Section Feature: Computer Industry — 1992: Impact of European Unity				
Aug. 28		Aug. 11	Aug. 18		The DEC Market			
Sept. 4		Aug. 18	Aug. 25	Salary Survey				
Sept. 11		Aug. 25	Sept. 1	Job Satisfaction Survey 2nd Annual *Premier 100*			Networld	
Sept. 18**		Sept. 1	Sept. 8	Hardware Roundup: Large & Medium Scale Systems				
Sept. 25		Sept. 8	Sept. 15	Hardware Roundup: PC's, Workstations & Small Systems				
Oct. 2	(Ad Close: Sept. 1)	Sept. 15	Sept. 22		ISDN Products	Integration Themes	TCP/IP Conference	Info '89
Oct. 9*		Sept. 22	Sept. 29	Special Report: MIS in the 1990s			Info '89	
Oct. 16		Sept. 29	Oct. 6		LANs			
Oct. 23		Oct. 6	Oct. 13	Executive Report: Security in Open Times				
Oct. 30		Oct. 13	Oct. 20		The Unix Market			
Nov. 6	(Ad Close: Oct. 6)	Oct. 20	Oct. 27	Executive Report: Keeping Up with Service Expectations		Integration Themes		Comdex Fall
Nov. 13		Oct. 27	Nov. 3	Special Report: TBA (Comdex Show Issue)			Comdex Fall	
Nov. 20*		Nov. 3	Nov. 9***	Executive Report: IS as a Catalyst For Business Initiatives				
Nov. 27		Nov. 9***	Nov. 17		Modems & Muxes			
Dec. 4		Nov. 17	Nov. 22***	Executive Report: Computing in the Executive Suite				
Dec. 11**		Nov. 22***	Dec. 1		OS/2 Software			
Dec. 18		Dec. 1	Dec. 8	Section Feature: Management — Continuing Education For CIOs				
Dec. 25, 1989 & Jan. 1, 1990		Dec. 8	Dec. 15	Forecast '90				

* Starch Ad Study Issue ** Harvey Ad Study Issue *** Note Early Close

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